May 10, 1943

STEEL

The Magazine of Metalworking and Metalproducing

IN TWO SECTIONS — ESTABLISHED 1882 — SECTION ONE

1943

These "Men from Mars" are building our future

BUY U.S. WAR BONDS AND STAMPS

Moltrup Steel Products Company

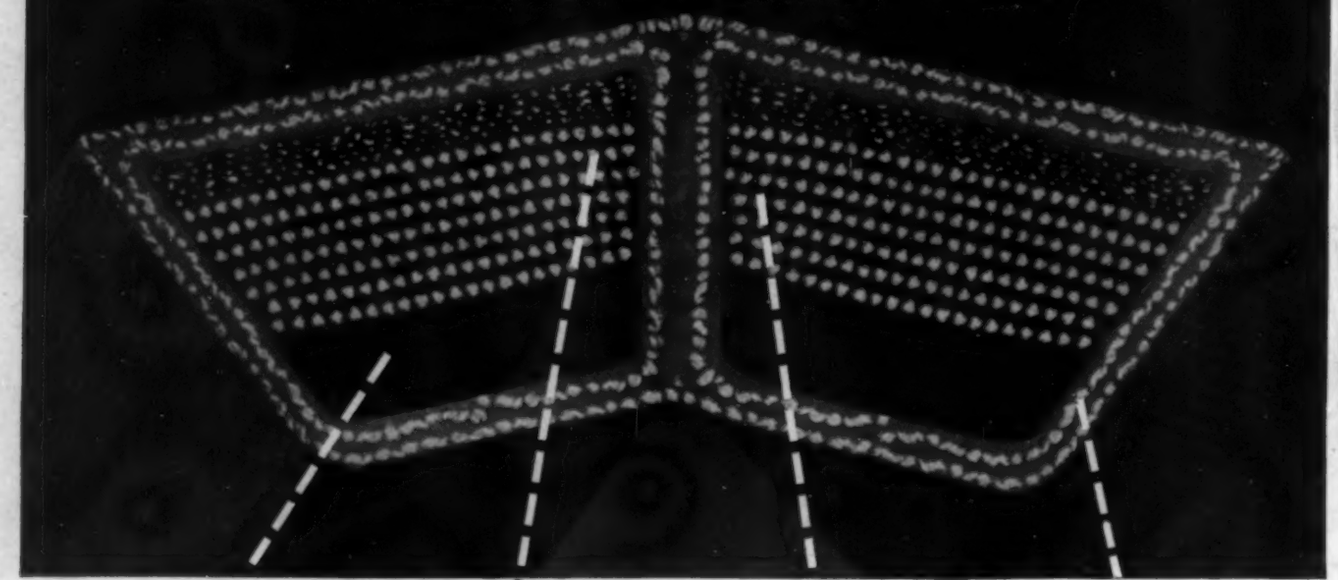
BEAVER FALLS, PA.

COLD DRAWN STEEL — MACHINE KEYS AND RACKS — FOUNDRY PLATES

Open Book on WARTIME CARE OF V-Belts

Texrope Super-7's new Design-Against-Wear points to ways *you* can make V-belts last longer — whatever brand you use — saving equipment vital to victory!

V-Day needs every V-Belt



DESIGN VS. HEAT . . . Texrope Super-7's revolutionary new shock-absorbing rubber cushion contributes to cool operation.

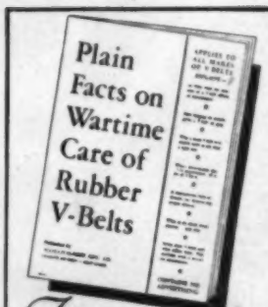
YOU can fight friction and heat by preventing misalignment. When present, it subjects V-belts to rubbing on their sides . . . builds up heat. So keep grooves in line — shafts parallel. And send in to Allis-Chalmers for "Plain Facts on Wartime Care of Rubber V-belts"; see p. 9.

DESIGN VS. STRETCH Texrope Super-7's 50% stronger cords produced by the new Flexon process combat stretching — plus the slip and heating that might result.

YOU can fight stretch — no matter what make of V-belts you are using — by promptly taking up any extra slack that may develop. Inspect drives regularly. See pp. 6 & 7 of Allis-Chalmers' new V-belt maintenance book for tips on proper tension.

DESIGN VS. BREAKS The 20% more cords built into the new Texrope Super-7 combat strains.

YOU can fight breaks by requiring that your V-belts never be pried into grooves — nor rolled from one groove to the next. Before installing or removing V-belts, the motor always should be moved forward. For added data, see POST MORTEMS, starting on p. 12 of "Plain Facts on Wartime Care of Rubber V-belts."



Free! Every engineer should have this important new handbook in his technical library. Applies to *all* makes —contains no advertising.

When you do need new V-belts, invest in the best . . . Texrope Super-7!

A 1542-A

ALLIS-CHALMERS

TEXROPE SUPER-7 V-BELTS

WE WORK FOR VICTORY — WE PLAN FOR PEACE

*Trade mark registered U. S. Patent Office. Texrope Super-7 V-Belts are the result of the cooperative research and design genius of two great companies — Allis-Chalmers and B. F. Goodrich — and are sold exclusively by Allis-Chalmers. Available in all sizes.....½ h.p. to 2,000 h.p.

Bethlehem
fused-finish
Electrolytic Tinplate

The first of Bethlehem's electrolytic tinplate units is now in operation. Its installation will effect a saving in tin used per base box of about 60% and is in line with the Government's request that this important material be conserved.

The tin so deposited electrolytically is subsequently fused or melted, and results in a product having a more even, lustrous coating. Tests have demonstrated that this electrolytic tinplate is suitable for general line cans, for sanitary cans for many processed foods and for bottle crowns and screw caps.

For further information, get in touch with Bethlehem Steel Company, Bethlehem, Pa., or with the Bethlehem district office nearest to you.

BETHLEHEM STEEL

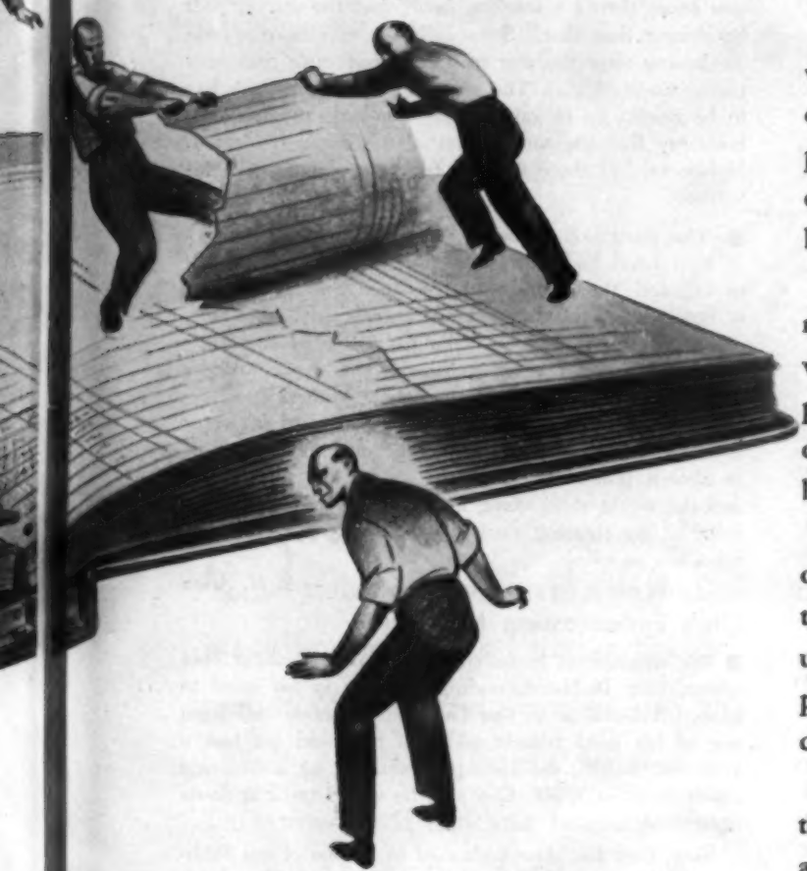
FIFTH COLUMNISTS

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

MONARCH LATHES

Cover the Turning Field

on the Records



TIME is the essence, now. Multiple shifts are doubling and tripling output. First costs of mechanical equipment are being absorbed two or three times as fast as normally. By the same token, utility values of machines decrease in like proportion, with increased working hours, overloading and less preventive maintenance.

IF NOT STUDIED and acted upon, false book values and cost figures set up by these conditions could readily sabotage postwar planning. Unheeded and uncorrected, they could become dangerous fifth columnists, bring financial disaster.

OBSOLESCENCE, too, is taking its toll. Many machines that are fully adequate for current work may be completely unfitted for postwar production. New processes, new materials, changes in line or designs may necessitate basic changes in production setups.

WE SHOULD scrutinize *normal* costs and outputs of mechanical tools to see whether they offer ample utility with "business as usual." Will they deliver, in cost and quality, products that can be sold against world-wide competition?

TAX AUTHORITIES, too, should recognize these facts. Faster depreciation should be allowed for machines which are being driven so hard, or which may rapidly become obsolete. This will permit the reservation of "seed money" now, for replacements when needed and available.

IF VICTORY is to bring work and prosperity, we must rid our bookkeeping of these unintentional fifth columnists, which are as dangerous in business as willful sabotage is in war.

BEHIND THE SCENES

More Mail from the West

■ Winging in by airmail comes the following message from Detroit editor, Art Allen, now on the last leg of his tour of the aviation companies throughout the South, the Southwest and the Pacific Coast:

—En route, Klamath Falls to Portland, Oregon.

AFTER about four weeks of the Grand Circle Tour, and while the *Oregonian* lurches northward through the pine forests of the Beaver State, the time is ripe for retrospect. Outside the line of duty there have been many highlights:

Sights Worth Remembering—

■ The luxury and comfort of the Illinois Central's crack *Panama Limited*, diesel-electric speedster between Chicago and New Orleans . . . The Mississippi River from the concrete wharf at the foot of Canal Street, with the prominent sign, "Positively no photographs, by order of the Coast Guard" . . . The vast modern plant for manufacture of patrol bombers which Consolidated Aircraft is readying along the shore of Lake Pontchartrain . . . *The dimming beauty and romance of New Orleans' Vieux Carre* . . . The spectacular beauty of the mountains in west Texas when you come upon them; and the rich verdure of the irrigated Rio Grande or Magic Valley east of El Paso . . . The broad stretches of cactus-packed desert in Texas, New Mexico and Arizona, and the peculiar rumbling noise of the train rushing across shallow arroyos on wood trestle-work . . . Indian women still sitting on the station platform at Yuma, peddling their novelties in stoic silence. (*We snapped a picture of one seated directly in front of a sign which read, "Rubbish Only", but it cost us a quarter.*)

■ The unparalleled beauty of the new Spanish-style Union Station in Los Angeles—a whopper of a place . . . Novel effects of camouflage treatment of practically all the southern California aircraft plants . . . Barrage balloons along the coast and the crack overheard by one quipster who remarked that they reminded him of a certain friend because they were a "big bag of wind and a long line" . . . *The Annual Parade of Wing Dings at the Jonathan Club in Los Angeles—a swell party by a great bunch of guys* . . . The broad expanse of San Diego harbor and environs, as seen from the Sky Room at El Cortez hotel . . . The ride up the coast to San Francisco on the *Morning Daylight*, which provides a rare combination of ocean and mountain scenic wonders . . . The cable cars still lumbering up Powell and Mason streets in San Francisco, pack-jammed with sailors on leave . . . The varied beauties and engineering landmarks of the Bay Area as seen from the Top O' the Mark Room on the nineteenth floor of the Mark Hopkins hotel (*free postcards and mailing to all*) . . . The spectacular Kaiser operations at Permanente in the Santa Cruz mountains south of San Francisco, where the top of a "hill" 2300 feet above the plant level is being literally chewed off to supply limestone and clay for what they say is the largest cement plant in the world . . . Surrendering a cab in front of the St. Francis hotel to Mrs. Eleanor Roosevelt. *We were going down Market street and she was going up. She smiled, we bowed and away she went* . . . The ride over the Oakland Bay bridge on the Key System and the urge to get out the camera to record the scene (no dice on pictures anywhere along the coast) . . . The greater thrill of crossing the bay on the Southern Pacific to catch the train north.

Sights Worth Forgetting—

■ The sad deterioration of passenger service between New Orleans and Los Angeles and on up the coast. The stock answer to even a mild complaint is *"Don't you know there's a war on, bud?"* but the matter goes far deeper than that. Some railroads may have a rude awakening after the war to find their former passenger traffic vanished . . . The reams of red tape which has to be wound up to gain entrance to some plants. Your hosts say they are sorry, but that the army requires it. Mebbe so, but there is a woeful lot of lost motion involved.

■ The disruption of hotel services occasioned by lack of help (and bad management in some cases, we suspect), and the widespread insolence and discourtesy of hotel clerks, telephone operators, cab drivers, porters, dining car stewards, etc., who seem to feel that they are doing you a favor by allowing you to spend your money on them . . . M. P.'s searching soldiers and sailors as they board trains to remove bottles of firewater from their pockets . . . The unbelievable traffic jams at aircraft plants and shipyards as the day shifts leave and the swing shifts come in . . . Snow in the Oregon woods. We thought we had seen the last of that stuff for a few months!

—A. H. Allen

Life's Embarrassing Moments

■ We would hate to embarrass our own Machine Tool editor, Guy Hubbard, unduly but this is too good to keep. A week or so ago Guy had a phone call from one of his good friends asking if he could get him a copy of "RQD", the new plan evolved by a Mr. van Zandt down at WPB. Guy said he would track it down right away.

Now, Guy has always claimed to be one of our faithful followers but apparently he had missed the March 22 issue which carried "RQD" so he got on the phone and made several calls around town, finally talking with someone at the local office of WPB.

"Yes," they said, "we believe that plan was gotten out by one of the large industrial publishers. Just a minute and we'll check . . . yes, if you will just call the magazine STEEL at Main 8260 I'm sure they'll be able to give you a copy."

To which Guy meekly replied, "Thank you".

Conversion

■ Signs of the Times: The Manitowoc Church Furniture Co., manufacturers of church pews, altars and pulpits, requests in a letter this week one copy of "Modern Shell Production".

Vol. 112, No. 19, May 10, 1943, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 43

TO HELP AMERICA MAKE HER *Victory Steel*

ON May 10 production of Magnefer was begun at a new kiln plant, just completed under the direction of Basic Refractories, Inc., in behalf of Defense Plant Corporation. This new unit adjoins our burning plant at Maple Grove, Ohio. It supplements the Company's capacity for the manufacture of Magnefer, Syndolag and other clinkered dolomite products.

Basic Refractories' customers now are assured of ample supplies of Magnefer and Syndolag needed in the industry's war program, which calls for extra millions of tons of open hearth and electric steel.

BASIC HEARTH
REFRACTORIES

BASIC REFRACTORIES, INCORPORATED

CLEVELAND, OHIO

PRODUCERS OF MAGNESITE AND DOLOMITE HEARTH MATERIALS FOR STEEL FURNACES

O.W.I. by Palmer, in an Allegheny Ludlum Plant

GRAY... and Skilled...

IN THE SERVICE OF STAINLESS STEEL

THE production of alloy steels is essentially a matter of technique. Many of them are complex, metallurgically; and all of them are compounded to a nicety and processed to specific requirements of surface finish and physical properties.

More often than not, the ability to produce these alloy steels successfully to such close limits, and the added ability to multiply the tonnage many times under the necessities of war, come as a result of having developed the *original* technique. The accumulated knowledge and experience of the mill technicians and men who developed an idea into a special steel, and shouldered the trials of pioneering it commercially, make all the difference.

For Allegheny Ludlum, that is true in the cases of stainless steel, gasoline engine valve steel, and many alloys for electrical purposes. It is true also of certain tool and die steels, notably the DBL High Speed Steel analysis, which has replaced "18-4-1" on the majority of the nation's production jobs.

These steels of our development are among the most vital of the war. We want to place our "know-how" completely at your disposal, to help you select them wisely and use them well, without waste. ● Call on us for technical and fabricating data, or for the help of our Technical Staff.

ADDRESS DEPT. S-4

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

A-8825 . . . W & D

"MORE PRODUCTION, BETTER FINISH, REJECTS ELIMINATED—Grinding Airplane Cylinder Valve Seats"

writes
POR-OS-WAY'S WAR PLANT REPORTER

Dear Charlie:

I'm writing this from the [redacted] plant, and here's more bad news for the Axis.

The use of Por-os-way is producing one additional airplane barrel, with valve seats precision-ground, every working hour. Multiply that one out, and you can see that Por-os-way's got something — something that the Axis doesn't like.

So long 'til next report

Your roving reporter

"Vic"

THE JOB:
Removing .010" to .012" from valve seats of airplane cylinder barrels on a Waddell Valve Seat Grinder—wet grinding at 5,000 R.P.M.

THE WHEEL:
Por-os-way 3¼" x ⅜" x 1⅛" C80 HV3.

All facts and figures given are taken from an actual field survey made by a Por-os-way correspondent.

WRITE for complete booklet "Facts About Por-os-way". The address is 436 Wheatland St., Phoenixville, Pennsylvania.

THE RECORD	POR-OS-WAY	FORMER WHEEL
Pcs. per Hour (2 Seats per Cylinder Barrel)	5*	4
Dressings	None	3 per wheel
Pcs. Per Wheel	300-375	120-150
Life of Wheel	1½ days	1 day
Average Depth of Cut	.005"—.008"	.001"—.003"
Rejects	None	2%
Finish	Superior	———

*Conservative. Por-os-way has proved ability to grind 8 pcs. per hour, or 100% more than former wheel.

Remarks (by foreman). "My men take pride in their work. If a wheel is too hard and burns work, it means lost time and material and gets them sore. We are sold on the merits of Por-os-way."

2 TO 5 TIMES MORE *WAR* PRODUCTION PER MAN PER MACHINE

POR-OS-WAY* *a new* RADIAC* PRODUCT

A. P. DE SANNO & SON, INC.
NEW YORK, CHICAGO, PITTSBURGH, CLEVELAND, DETROIT, LOS ANGELES

PHOENIXVILLE, PENNA.
Western Gateway to VALLEY FORGE

*T. M. Reg. U. S. Pat. Off.

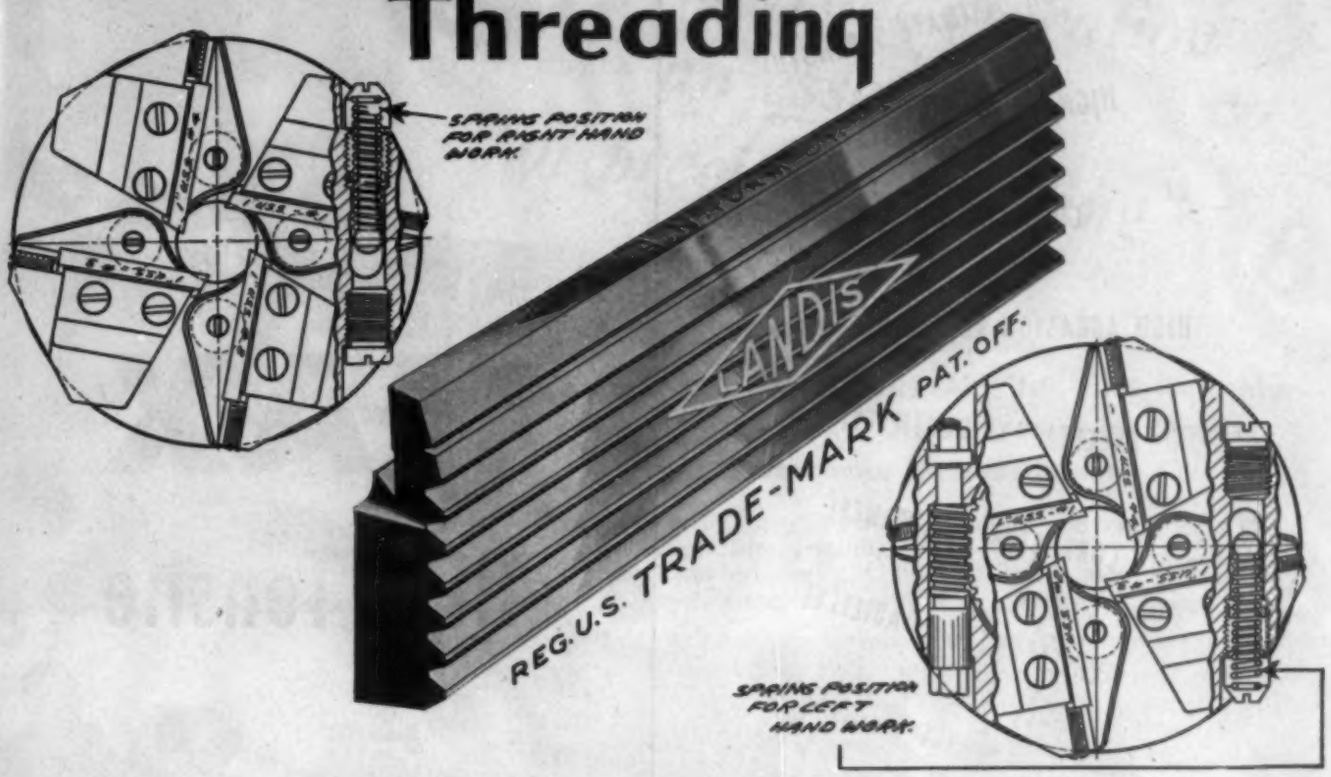
COPYRIGHT, 1943, A. P. de Sanno & Son, Inc.

HEAT-TREATING *and*
STRESS-RELIEVING *under*
Precision Control
to meet EVERY DEMAND
of your WAR-TIME PRODUCTION!

SWINDELL **GAS FIRED CAR BOTTOM** ***FURNACES***

SWINDELL-DRESSLER *Corporation*
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES
PITTSBURGH, PA.

LANDIS CHASERS Can Be Used For Both RIGHT and LEFT Hand Threading



12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers
2–Rake angle range covers all machinable materials
3–Free cutting condition permits maximum cutting speeds
4–Simple grinding operation renews entire cutting edge and leading feature
5–Line contact with work lessens friction and minimizes thread distortion
6–Leading feature insures thread of accurate lead
7–Lateral absorption of cutting strain reduces vibration and chaser breakage
8–Right and lefthand threading feature reduces chaser equipment
9–Standard chasers thread all diameters with proper chaser holders
10–Interchangeability of chasers lowers operating cost
11–Chaser length provides exceptionally long life and low tool cost
12–Permanent throat gives equal distribution of cut

With Landis Tangential Chasers, Tool Inventories and Installation Costs Are Materially Reduced Since . . .

The same chasers may be employed for both right and left hand work merely by grinding the proper cutting angles at both ends of the chasers. For cutting left hand threads, use left hand chaser holders and reverse the action of the spring as illustrated above.

The Finest Thread Cutting Tool in Industry

LANDIS MACHINE COMPANY

WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

OUTSTANDING RESISTANCE TO FATIGUE!

HIGH ULTIMATE STRENGTH!

HIGH IMPACT RESISTANCE!

COLD FORMS EASILY!

HIGH ABRASION RESISTANCE!

EXCEPTIONAL DUCTILITY!

GOOD CORROSION RESISTANCE!

EXCELLENT WELDABILITY!

INHERENTLY FINE GRAIN!

NON AIR HARDENING!

N-A-X

High Tensile

N-A-X HIGH TENSILE is an outstanding steel with properties which make it ideal for applications requiring rugged strength plus high fatigue and impact resistance in both normal and sub-zero temperatures.

Widely used in the manufacture of equipment for our armed forces, N-A-X HIGH TENSILE is daily proving its superiority on every battle front.

Why not investigate the unusual properties of this superior steel? A Great Lakes engineer will be glad to discuss your production problems with you—to show you how other manufacturers are using this remarkable low alloy steel to advantage. Send for new booklet on N-A-X 9100 Series—and useful Hardenability Chart.

GREAT LAKES STEEL CORPORATION

Detroit, Michigan

Sales Offices in Principal Cities

NATIONAL STEEL

Division of

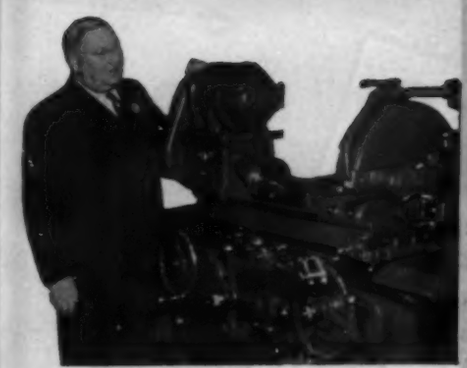
NATIONAL STEEL CORPORATION

Executive Offices · Pittsburgh, Pa.

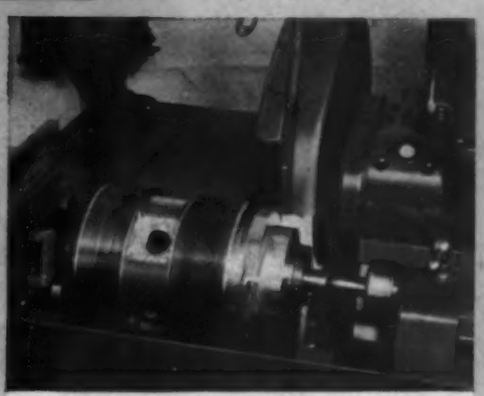
"Freedom from vibration an essential of precision grinding"

says HOWARD W. DUNBAR, V.P. and Gen. Mgr.
Norton Company, Grinding Machine Division
Worcester, Massachusetts

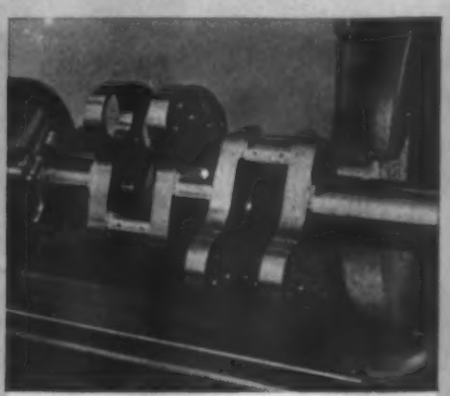
The Norton Company's biggest single contribution to the field of precision grinding in the War Effort is a 36" x 816" cylindrical grinder . . . sixty-eight feet between centers. The world's largest, it will work directly for Uncle Sam.



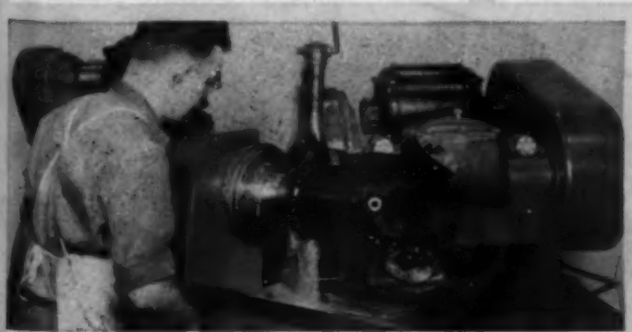
"To produce precision finishes to close tolerances, a grinding machine must be absolutely free from vibration. It is not enough merely to build a machine with massive construction and ample power, with grinding wheel and driving motor in perfect balance; it must have friction-free operation and proper lubrication.



"These principles were built into the first precision grinder by Norton in 1900. The lightweight, small wheel which did little but "tickle" or polish the work was discarded and ample weight, strength and power were established as fundamentals in production grinding. Present-day grinders differ only in refinement and still more massive construction.



"The operator, too, has a responsibility in obtaining precision and finish. He will get good stock removal only if he keeps his machine working under conditions approaching the ideal. Naturally for efficient stock removal he must have the most efficient grinding wheel for the job and must operate with the proper work-and-wheel speeds.



"Not the least important design factor is weight in mass, properly distributed to absorb vibration. Proper wheel truing is vital to precision grinding, and conversely, a machine free from vibration is essential to good wheel truing. Every effort must be made to maintain steady, constant and uniform pressure of the wheel against the work to avoid chatters and other variable grinding faults. In short, the operator must combat vibration in all its forms. Correct and constant lubrication will keep his machine operating smoothly."

In precision grinding the selection of the proper cutting oil is as important as freedom from vibration. That's why Shell has developed a control technique that "balances" the oil to the machine, the application and the tool. Call in the Shell man now for details.

SHELL

SHELL LATA OILS
FOR METAL WORKING

THIS 600 TON GIANT

SHEARS COPPER BILLETS HYDRAULICALLY

Watson-Stillman hydraulic metal shearing machines have made it possible for war-geared industry to meet ever-increasing production schedules. In this highly-mechanized war, metal working is playing a major role behind the firing line, and Watson-Stillman hydraulic machinery—of many types and for many uses—has been right in the thick of the "production front."

Shown above is the latest Watson-Stillman 600-ton, self-contained Hydraulic Copper Billet Shear capable of shearing non-ferrous metal billets having a cross-section of 3 inches thick by 16 inches wide, and a shearing strength of 45,000 pounds per square inch. It operates at an advance and shearing speed of 63 inches per minute, and return speed of 250 inches per minute.

POST-WAR PROBLEMS are going to be easier to solve because of the technical advantages gained by the necessities of war-time production. Watson-Stillman engineers, backed by almost a hundred years experience in the manufacture of hydraulic machinery, offer you their services NOW, so that you can be prepared for the post-war problems of your industry. Now is the time to ask for Watson-Stillman advice. The Watson-Stillman Co., Roselle, N. J.

WATSON-STILLMAN

Hydraulic Equipment, Valves, Forged Steel Fittings

For Victory ★★★ Let's all be Scrappers

ROEBLING "Blue Center" helps 'em get there first!

Pushing stubby assault boats ashore, through withering enemy fire, storming the beaches and mopping up enemy strong points—advancing inland to take and hold strategic airports, towns, road and railroad junctions—there is more to a successful invasion than these stirring deeds of U. S. fighting men in North Africa. To make that invasion possible, to make it *stick* till all objectives are fully attained, takes the brains and brawn of thousands of men who may never get to see the fighting at all—sailors on escorting warships, seamen on transports, dockworkers and stevedores to load and unload thousands of tons of equipment and supplies. It is these men and their ships *and their rope-equipped machinery* that make up the physical basis of *logistics*—the art and science of getting there first with the most and *staying longest!*

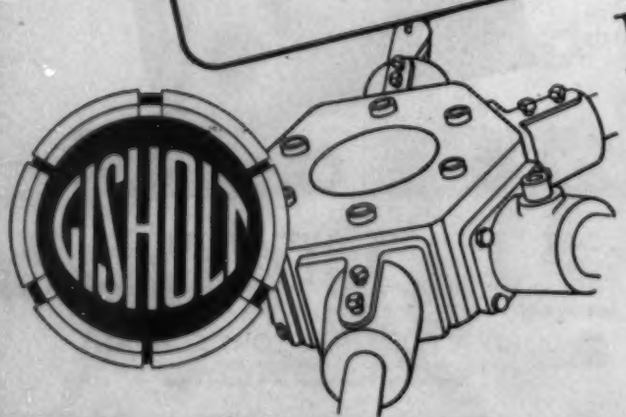
It's a tough job, meeting all the needs of a sizeable army in the field against a powerful enemy. Army Engineers and special stevedore units, Navy crewmen, merchant seamen—all of them swing to with a will. And they keep the ammunition coming for men and guns. In many of these places where the going is tough today, Roebling "Blue Center" Steel Wire Rope is in there swinging. Bringing to this tough job too the extra values built into it by Roebling Engineers out of their experience in the field—in Roebling's mills—in Roebling Development Engineering. Meeting unfailingly all the demands of Victory.

YOUR ROPE LOGISTICS . . . GET THE MOST OUT OF IT!

You can do a lot to save steel by observing simple precautions in the installation and handling of wire rope, and help conserve rope for use by our fighting men. To make the job even easier, Roebling has prepared a handy tag—yours for the asking—to fasten right to your machinery where it'll do the most good. Our nearest office will gladly supply you with as many as you need. Ask for Tag "A".

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

"HERE'S WHY I CAN'T BE CARELESS!"



NO TELLING where these parts will go. But wherever it is, they've got to be fit to fight. And that means precision in every single one of 'em.

America's fighting forces depend upon mass production—upon interchangeable parts—for building and maintaining our vital fighting equipment.

American industry depends upon Gisholt Turret Lathes for the speed and accuracy that make mass production possible

GISHOLT MACHINE COMPANY
1217 East Washington Ave. • Madison, Wis.

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements in Metal Turning

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

Mighty Midgets

ABRASIVE COMPANY

MOUNTED WHEELS AND MOUNTED POINTS

They're little, yes—but mighty important to the metal-working industries engaged in making Uncle Sam's war equipment.

ABRASIVE Mounted Wheels and Points perform many thousands of intricate and difficult precision grinding jobs in war plant tool rooms and on production lines . . . for die grinding on alloy and hardened steels, for burring and "breaking edges" on precision ground mechanical parts, for cleaning out stock and for grinding out those "hard-to-get-at" places so frequently encountered.

Airplane engines, gun mechanisms, tank parts, shells and bomb parts are regularly being ground at various stages throughout their manufacture with ABRASIVE Mounted Wheels and Points. Expert skill and experience in making abrasive materials and bonded abrasive products for over fifty years permit us to offer war manufacturing industries a complete line of all sizes, shapes and specifications of mounted wheels and mounted points of the highest quality.

Special types of abrasives, bonds and manufacturing facilities give ABRASIVE Mounted Wheels and Points a fast, cool cutting-action, long useful life and a high degree of mechanical accuracy. Try them on your work, now—both in the tool room and for production. Your inquiry will bring complete details.

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

TACONY & FRALEY STS., PHILADELPHIA, PA. • CHICAGO BRANCH: 127 SOUTH GREEN ST.

DISTRIBUTORS IN ALL PRINCIPAL CITIES

EGYPTIAN FINISHED EGGS FOR TOJO'S FINISH

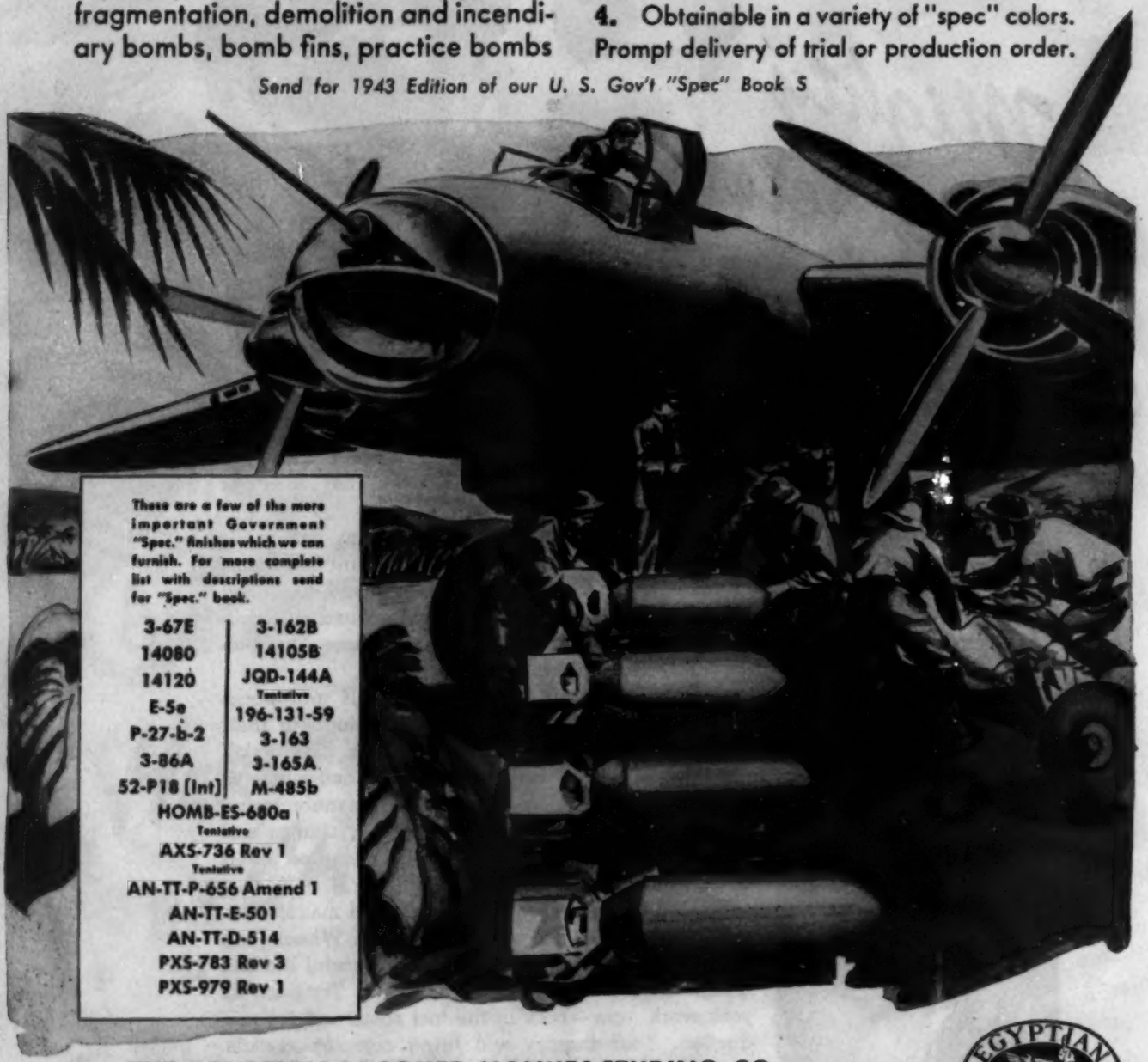
To make sure that our bombs for victory will reach Tokio, Berlin and other desired destinations in perfect condition, we recommend coating them with EGYPTIAN lustreless enamels meeting **U. S. GOV'T SPECIFICATION FINISH 3-162B** expressly developed for all types of fragmentation, demolition and incendiary bombs, bomb fins, practice bombs and other ammunition components.

Consider these four advantages of EGYPTIAN 3-162B:

1. Application by dip or spray directly on clean bare metal. No primer.
2. Air dries quickly at room temperature.
3. Complete hiding by one dip coat.
4. Obtainable in a variety of "spec" colors.

Prompt delivery of trial or production order.

Send for 1943 Edition of our U. S. Gov't "Spec" Book S



These are a few of the more important Government "Spec." finishes which we can furnish. For more complete list with descriptions send for "Spec." book.

3-67E	3-162B
14080	14105B
14120	JQD-144A Tentative
E-5e	196-131-59
P-27-b-2	3-163
3-86A	3-165A
52-P18 [Int]	M-485b

HOMB-ES-680a Tentative
AXS-736 Rev 1 Tentative
AN-TT-P-656 Amend 1
AN-TT-E-501
AN-TT-D-514
PXS-783 Rev 3
PXS-979 Rev 1

THE EGYPTIAN LACQUER MANUFACTURING CO.
ROCKEFELLER CENTER, NEW YORK, N. Y.

EGYPTIAN FINISHES

EGYPTIAN
Superior FINISHES

The Diesels in These Landing Boats have Pistons of

ArmaSteel*

The use of ArmaSteel pistons cannot swing the tide of battle, or reduce in any measure the difficulty of this military operation.

Yet ArmaSteel is used, and for these valid reasons: It insures longer piston life and reduces maintenance, as demonstrated by the service record of ArmaSteel pistons in Diesel engines. It speeds production of pistons because of its exceptional machinability, and because ArmaSteel castings conform closely to final shapes. It conserves critical materials by replacing steels and alloys formerly used in this application.

Scores of diversified parts are today being built of ArmaSteel by war industries. ArmaSteel is qualified to serve in your present production and future developments.

SAGINAW MALLEABLE IRON
DIVISION OF GENERAL MOTORS
Saginaw, Michigan

*Reg. U. S. Pat. Off.

CAST FOR A LEADING ROLE IN INDUSTRY

"Pittsburgh" Announces

NEOCETA*

[SYNTHETIC BRISTLE]

—an important scientific discovery which makes possible synthetic bristle brushes as efficient as those made with high grade natural bristles.

—developed by Pittsburgh Plate Glass Company, Brush Division, laboratories after a 3-year research . . . produced exclusively by "Pittsburgh" . . . ready now!

—makes possible America's first full line of practical synthetic bristle brushes.

Two years before Pearl Harbor, Pittsburgh Plate Glass Company scientists were experimenting with synthetic bristle—trying hundreds of formulas—testing results. Their aim was to make this country independent of the Far East as a source of supply—to provide against the shortage of natural bristles that would inevitably occur in case of war with Japan.

As the nation's leading manufacturer of quality brushes, we considered it our responsibility to continue to supply high-grade brushes regardless of where the war might spread.

Our three years of research work have now been crowned with complete success. A new substance called NEOCETA has been developed. Extensive tests prove that "Pittsburgh's" Neoceta bristle brush performance is comparable with any pre-war brush.

Practical! Workable! Durable!

Neoceta bristle is tapered, giving it the necessary elasticity and "feel" of natural bristle. Spreading ability is entirely satisfactory. Neoceta brushes hold as much—*or more*—paint as pure bristle brushes—and rival them in durability and the character of the film they produce.

Here, in short, is a product that is very far from being a temporary wartime substitute. It is a great step forward in paint application practices.

Availability

Winning the war comes first! Brushes of Neoceta are now available to the Army, Navy, or contractors for war materials for the Armed Services.

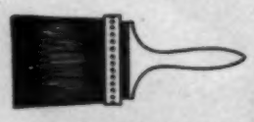
Bristle brushes, made and distributed in accordance with W. P. B. regulations, are also still available, with the necessary priority, through "Pittsburgh" branches everywhere.

NEOCETA

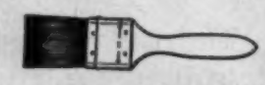
Brushes Available Now

Metal Bound Flat Paint—Professional type. 4" width, 4" length clear.

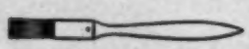
Metal Bound Flat Paint—Utility type. 4" width, 3¼" length clear.



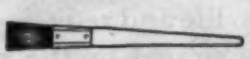
Leather Bound Flat Paint—Professional type. 4" width, 4⅛" length clear.



Flat Varnish—Utility type. 1", 2" and 3" widths. 2", 2½" and 2¾" lengths clear.



Touch-Up Flat Varnish—General work. ½" width, 1⅜" length clear.



Oval Sash—Sizes 4, 8 and 12. 1¾", 2¼" and 2¾" lengths clear.

Wall Coating or Calcimine—For use in resin emulsion paint as well as calcimine or oil paint. Size 5"x1½". 3¾" length clear.

Trade Mark Reg. U. S. Patent Office No. 397,100

PITTSBURGH
PLATE GLASS COMPANY

NEOCETA brushes are manufactured by the creators of famous *Gold Stripe* brushes

Insure Your Product Against Rust with EVERLASTING FASTENINGS *by* HARPER

YOU CAN insure your product against the ravages of rust and corrosion by using Everlasting Fastenings by Harper. The word, "Everlasting" refers to the alloys—brass, bronze, copper, Everdur, Monel and stainless steel. "Fastenings" refers to bolts, nuts, screws, washers, rivets and related "specials." For all practical purposes, they last forever.

Although the first cost of Everlasting Fastenings may be slightly more than the price of common steel or iron fastenings, the total cost is far less. Harper's Fastenings save hours and hours of time and labor required to replace rusted common steel bolts, they prevent failures of vital equipment and they keep production rolling regularly. They are not affected by ocean salt, tropic sweat, certain acids and alkalies and other tough conditions.

The H. M. Harper Company is the leading organization in America concentrating exclusively on fastenings made of the non-ferrous and stainless alloys.

4320 STOCK ITEMS

. . . of bolts, nuts, screws, washers, rivets and accessories in the noh-ferrous and stainless alloys.

WRITE FOR CATALOG

. . . and reference book — 80 pages — 4 colors—193 illustrations—numerous tables and other data. Free when requested on a company letterhead.

THE H. M. HARPER COMPANY

2646 Fletcher Street . . . Chicago

Eastern Branch: 45 West Broadway, New York City

Offices in Principal Cities

HARPER *Chicago*

EVERLASTING FASTENINGS

BRASS ★ BRONZE ★ COPPER ★ EVERDUR ★ MONEL ★ STAINLESS

ARMY E NAVY

"CHICKEN IN THE ROUGH"

Not much meat on these "chicken skeletons" of hard steel! But they are important to you, because they are vital parts of the machine that builds your roads.

There are thousands of odd-shaped pieces of steel, in the "works" of your car, in the engines and coaches of the trains you ride, in the trucks that haul your groceries, the machines that create your electricity, the appliances in your home.

And today, there are similar parts in the ships, tanks, planes, guns and trucks that make up our war machine.

These steel parts are made by a process called CASTING—pouring molten metal into a mold and allowing it to cool and harden. Any kind of steel can be cast, and almost any shape can be molded—from a few ounces in size to hundreds of tons.

Think of the job it would be to whittle one of these "chickens" out of solid metal, or to make one by joining many little bits of steel together!

Perhaps you never will buy a steel casting as such, but steel castings serve you every day, by making possible the manufactured products you use and live with—and making them quicker, cheaper and better.

. . .

There are about two hundred foundries in The United States that produce steel castings.

Today they are working night and day to turn out the military tools of war.

Tomorrow, they will resume the job of helping to make the things that contribute to your comfort, your convenience, your health, your safety.

The manufacture of steel castings is a typical forward-looking American industry, an important instrument of our American way of living. Steel Founders' Society of America, Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

What about These New *A.C. ARC WELDERS?*

TO be worthy of the P&H name plate, these new A.C. Arc Welders incorporate every modern refinement which experience and engineering skills can provide.

Industrial Models

The complete line embraces two different series of industrial machines (for intermittent and heavy duty service) with a wide range of capacities. To speed up and maintain welding on a high production basis, all models provide the continuous, concentrated arc which is so easy to control.

Rated on W.S.R. Basis

All models are rated on W.S.R. (Welding Service Range) which designates each machine's *usable* welding current. Actual delivered output from minimum to maximum capacity is clearly specified.

One Simple Control

Following P&H's policy of utmost simplicity in operation, these new A.C. Arc Welders have but a single control. Requiring no locking, blocking or other auxiliary devices, this creep-proof micromatic control provides continuous current settings from minimum to maximum capacity. Advanced design and the use of highest quality materials throughout, assure extremely high operating efficiencies. Literature on request.

P&H builds a complete line of A.C. and D.C. Welding equipment as well as a full line of welding electrodes.

P&H
ARC WELDERS

General Offices:
4411 W. National Ave., Milwaukee, Wisconsin

HARNISCHFEGER
CORPORATION
ARC WELDERS · EXCAVATORS · ELECTRIC CRANES · P&H · MOTORS · HOISTS · WELDING ELECTRODES

Canadian Distribution: The Canadian Fairbanks-Morse Company, Ltd.

SUPER REFRACTORIES BY CARBORUNDUM

INCREASE PRODUCTION . . . CUT MAINTENANCE COSTS . . . REDUCE OPERATING COSTS . . . INCREASE EFFICIENCY

In applications like these . . .

Aluminum Melting Furnaces	Electric Furnaces	Muriatic Acid Furnaces
Annealing Furnaces	Heat Treating Furnaces	Oil Refining Stills
Boiler Settings	Hydrocarbon Cracking Regenerators	Reheating Furnaces
Brass Melting Furnaces	Lime Kilns	Rotary Kilns
By-Product Coke Ovens	Magnesium Melting Furnaces	Tunnel Kilns
Carburizing Furnaces	Muffle Furnaces	Water Gas Sets
Ceramic Kilns	Muffle Roasters	Zinc Refining
Chemical Process Furnaces		Zinc Retorts

THE chart below gives you a quick summary of the characteristics of five super refractories by Carborundum which are doing a big job on the war production front. Each of these super refractories is made in many modified compositions providing a wide range of physical properties.

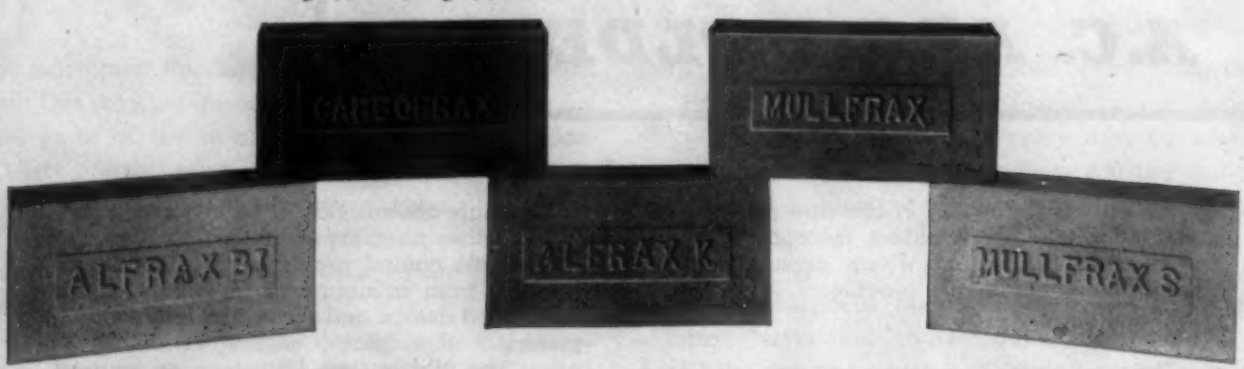
Please remember that our entire current production is going to war industries.

CARBOFRAX

1. Heat Conductivity, 109 Btu.
2. Refractoriness, PCE Cone 37-40
3. High Spalling Resistance
4. High Abrasion Resistance
5. Low Thermal Expansion
6. Specific Heat, 0.285
7. Weight, 9-in. Straight, 9.25 lb.

MULLFRAX

1. Heat Conductivity, 15 Btu.
2. Refractoriness, PCE Cone 38-39
3. High Spalling Resistance
4. Medium Abrasion Resistance
5. Medium Thermal Expansion
6. Weight, 9-in. Straight, 9.5 lb.



ALFRAX BI

1. Heat Conductivity, 7 Btu.
2. Refractoriness, PCE Cone 38
3. Good Spalling Resistance
4. Low Abrasion Resistance
5. Medium Thermal Expansion
6. Specific Heat, 0.320
7. Weight, 9-in. Straight, 4.5 lb.

ALFRAX K

1. Heat Conductivity, 21 Btu.
2. Refractoriness, PCE Cone 37-39
3. Medium Spalling Resistance
4. High Abrasion Resistance
5. Medium Thermal Expansion
6. Specific Heat, 0.330
7. Weight, 9-in. Straight, 10.1 lb.

MULLFRAX S

1. Heat Conductivity, 7 Btu.
2. Refractoriness, PCE Cone 37-38
3. High Spalling Resistance
4. Medium Abrasion Resistance
5. Medium Thermal Expansion
6. Weight, 9-in. Straight, 7.8 lb.

REFRACTORY PRODUCTS CARBORUNDUM

Refractory Division, **THE CARBORUNDUM COMPANY,** *Perth Amboy, N. J.*

REG. U. S. PAT. OFF.

MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

(Carborundum, Carbofrax, Alfrax and Mullfrax are registered trade-marks of and indicate manufacture by The Carborundum Company)

ALUMINUM HEADS

are just one of the many parts for America's fighting planes where Howard nonferrous castings are effecting weight savings—savings which impart higher speed or greater fire power, heavier bomb loads or more substantial armor.

As the nation's largest jobbing producers of magnesium and nonferrous castings, much has been expected of us in the war effort. We are proud of delivering more than was expected in large tonnages of cast parts of magnesium, aluminum, brass and bronze for America's planes, tanks, tank destroyers, ordnance, ship and armament-making machinery.

Nonferrous castings from the three Howard foundries are proving their value today in a myriad of armament applications, many of which are quite new and of which nothing can now be told. These uses, however, are definitely indicating important peace-time applications for aluminum, brass, bronze and magnesium castings in which the Howard foundries are due to figure prominently.

May we help your armament production with better nonferrous castings?

For armament today — for utility tomorrow.

Howard Foundry Company
4900 Bloomingdale Road Chicago

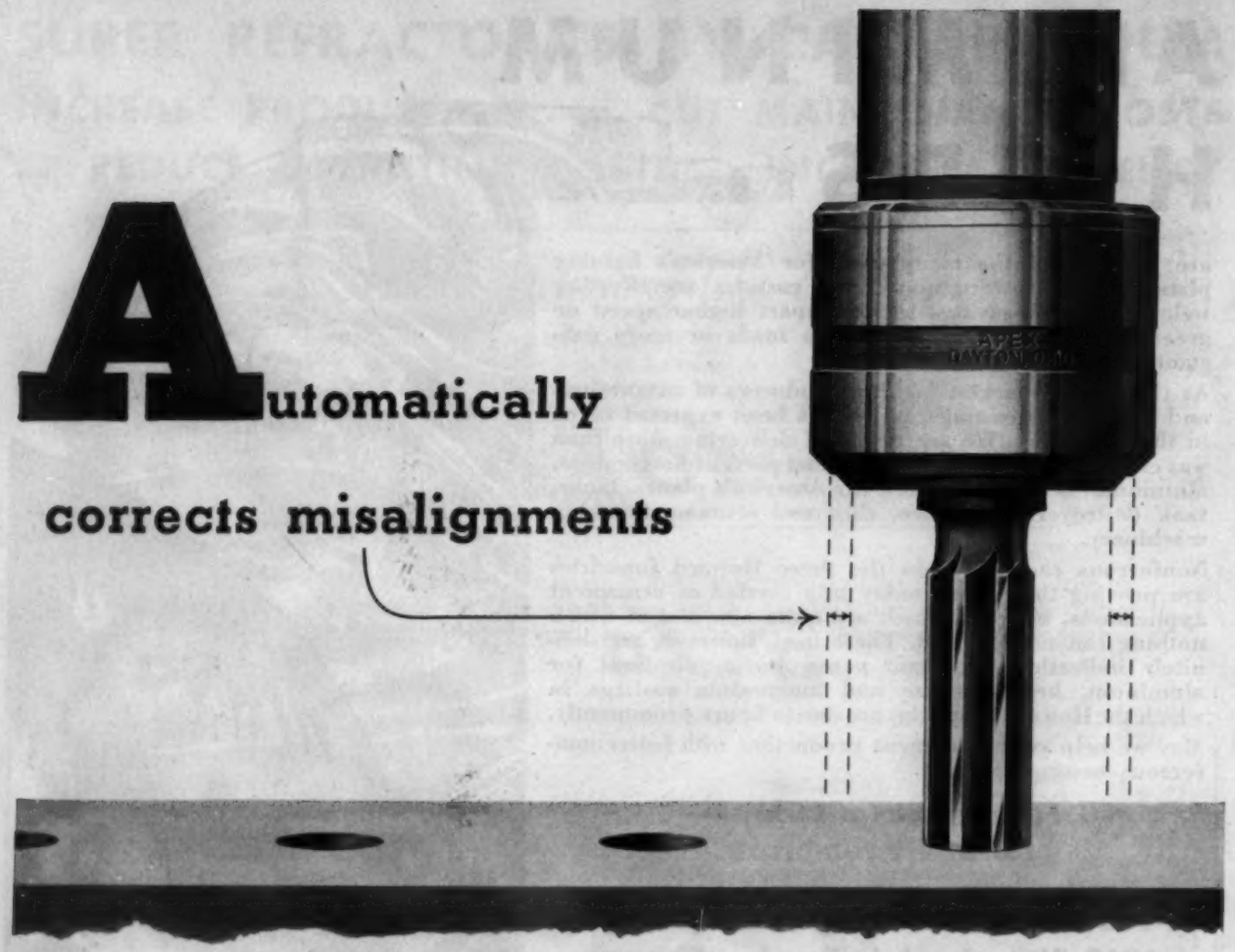
FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

ARMY E NAVY

HOWARD

ALUMINUM · BRASS · BRONZE · MAGNESIUM CASTINGS

Automatically corrects misalignments



YOU GET *uniformly accurate* reamed, tapped or bored holes with Apex Floating Tool Holders. Why? Because the parallel floating action compensates for lateral misalignments between spindle and part. Patented ball drive practically eliminates all friction in the holder itself.

This holder prevents bell-mouthed and tapered holes.

The amount of float ranges from a few thousandths to 1/10". You can specify the amount of float required within the above ranges.

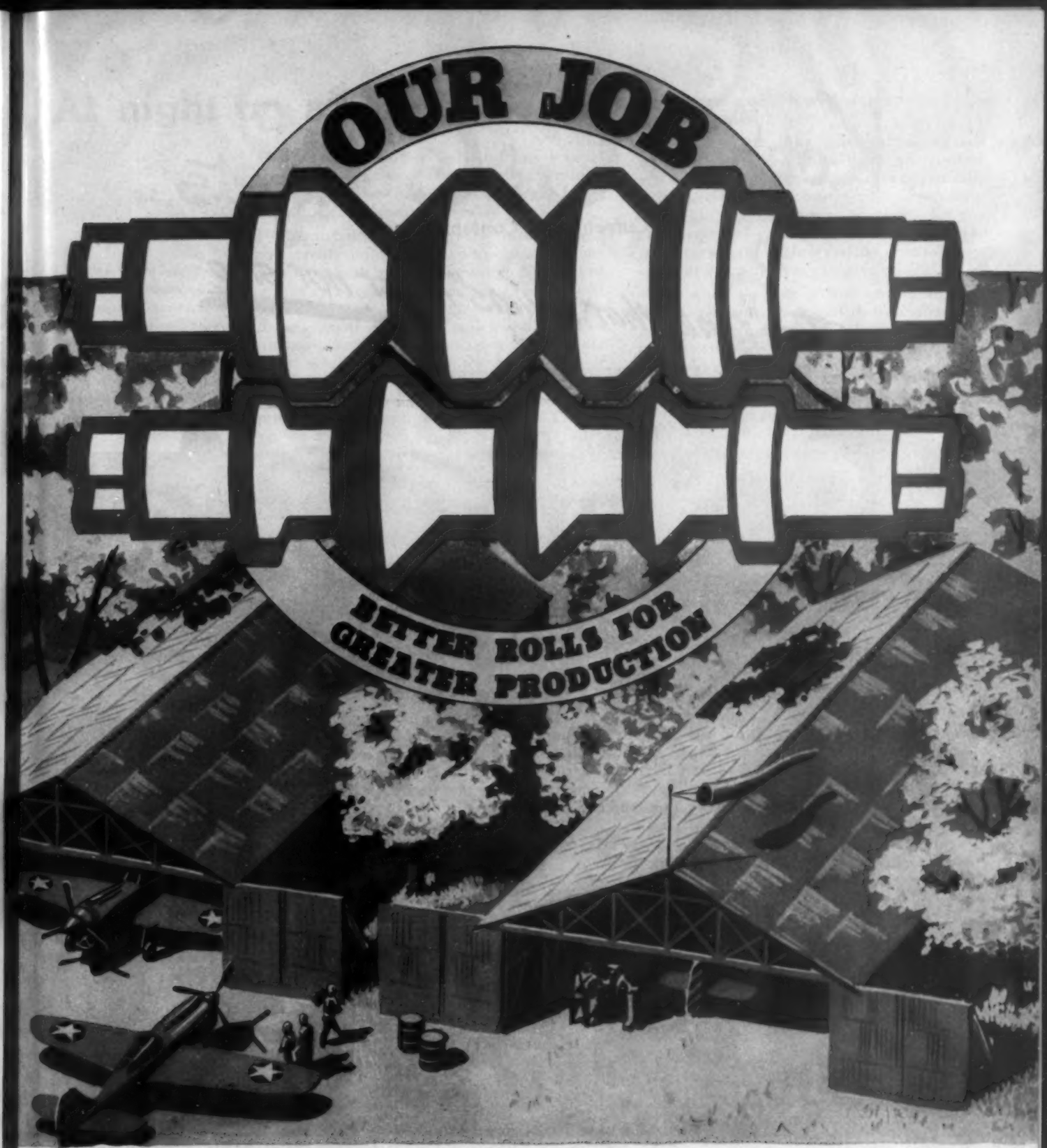
Shanks supplied for most requirements. Sockets may be had for Morse Taper or straight shank tools. These holders are also furnished with quick change chuck on bottom so a series of tools may be used. Made in two styles; one uses square type collets and the other uses quick change drill collets. Write for Catalog 14.

Chuck bottom type Extended socket type

APEX

THE APEX MACHINE & TOOL COMPANY, DAYTON, OHIO

Manufacturers of Safety Friction Tapping Chucks, Quick Change and Positive Drive Drill Chucks, Vertical Float Tapping Chucks, Parallel Floating Tool Holders, Power Bits for Phillips, Slotted Head and Clutch Head Screws, Hand Drivers for Phillips and Clutch Head Screws, Aircraft Universal Joints, Plain and Universal Joint Socket Wrenches.



There is no absenteeism on the part of Pittsburgh rolls. They are on the job 24 hours to the day in the continuous production of sheets and shapes vital to the winning of the war.

PITTSBURGH ROLLS

PITTSBURGH ROLLS DIVISION of
BLAW-KNOX CO.—"Steel's Partner" • PITTSBURGH, PA.

★ ★ ★ ★ FOR VICTORY BUY U. S. WAR BONDS AND STAMPS ★ ★ ★ ★

Koppers "C & C" * Projects

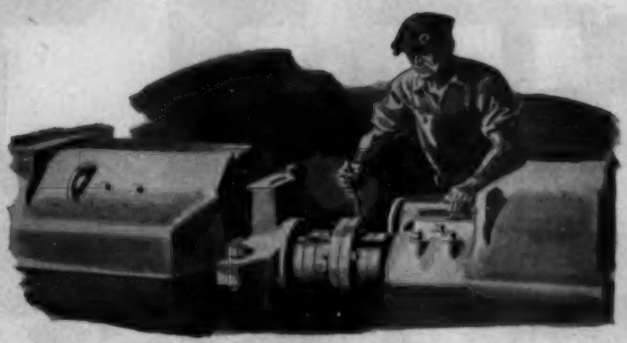
*Current and Contemplated

The "tank that swims" must not stop

Bartlett Hayward Division

1 Current

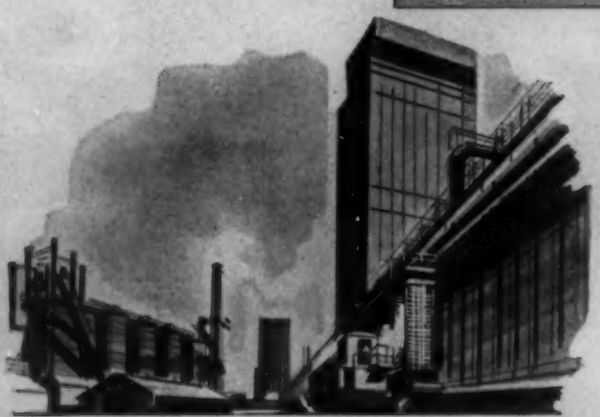
Koppers Fast's Self-aligning Couplings drive the Army's "alligator boats." When these American amphibian tanks plow through the water toward an enemy shore and then crawl up out of the water and lumber across the ground, it is Koppers Fast's Couplings that transmit the dependable power that drives them on land and sea.



2 Contemplated

Koppers Fast's Couplings will drive more of industry's wheels. The load-bearing surfaces are protected against wear by a positive film of oil, kept permanently clean by rocking bearings which make precise, metal-to-metal contact in the one position where they form a dust and moisture-proof seal. Exclusive with Fast's.

Engineering and Construction Division



3 Current

Since Pearl Harbor, Koppers has built plants with annual tar-producing capacity of 23,000,000 gallons, and ammonium sulfate capacity of 30,000 tons; recovery and refining plants with a capacity of 8,000,000 gallons of light oil (including 1,500,000 gallons of toluol).

4 Contemplated

The world of coal tar chemicals is a constantly expanding universe. Chemists are finding new ways to use these materials in vitamins, medicinals, plastics, paints, varnishes, synthetic rubber, fuel, and other products—and providing a better post-war market for these steel mill by-products.

Koppers Company and Affiliates

Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

At night on a lonely beach

Landing boats and tank lighters are grounding on the beach and our army is establishing a beach head. This scene has been enacted at Guadalcanal — in North Africa and at little-known harbors in New Guinea.

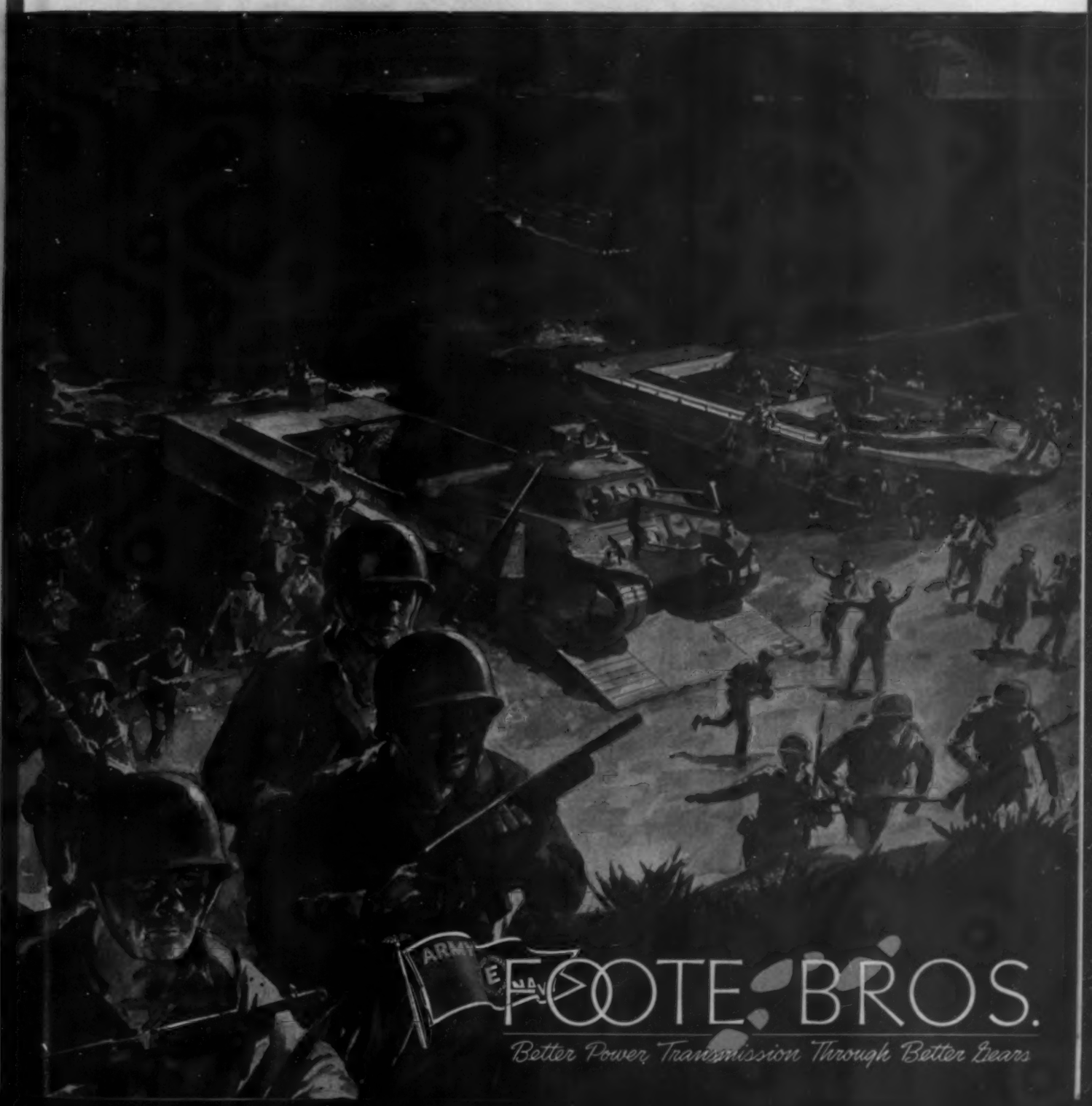
Dim shadows—low on the horizon—waves foaming on a sandy beach—then pushing through the darkness, landing barges bring threat of invasion to Axis-ruled lands!

Built to battle pounding surf—made to stand the jarring impact of landing—tough is the word for these barges. And tough is the word for the giant gears that drop their anchors and raise them. In fact, so tough are the blanks for these gears that cutting them was deemed an impossibility. Foote Bros. engineers and Foote Bros. workmen changed the conception of what was possible. And today, the landing barges which are keeping Hitler's armies pinned to the coast from Narvik to Tripoli give evidence of how well these special problems were solved.

Here at Foote Bros. new techniques and new manufacturing know-hows are responsible for gears and speed reducers of radically different design and construction—gears light in weight and of extreme precision for aircraft engines—gears of giant size and super toughness designed to stand the grueling punishment that only war can give.

But when the war is won and these same techniques can be applied to peacetime use, American manufacturers may look forward to revolutionary developments in all phases of power transmission.

FOOTE BROS. GEAR AND MACHINE CORPORATION
5225 South Western Boulevard • Chicago, Illinois



They Have MORE Planes, Tanks, Guns, Ammunition...

because of this...

Engineering victory in production can be lost without an engineering victory over fire. Realizing this vital truth was a foremost factor in the selection of Cardox Fire Extinguishing Systems... in important plants producing military necessities, such as:

Electric Power	Ships
Aviation Engines	Chemicals
Aviation Carburetors	Foods
Airplane Parts	Building Material
Ordnance	Combat Boats
Armor Plate	Hot Strip Steel
Processed Fabric	Rubber Products
Tanks	Forgings
Tank Engines	Solvents
Engine Parts	Motor Fuel
Cold Strip Steel	Trainer Engines
Plastics	Airplanes

ENGINEERING PROBLEM: To be certain of operation *without interruption* by fire, engineers demanded: (1) extinguishing coverage for each specific hazard, (2) immediate extinguishment—and cooling, (3) no damage from the extinguishing medium, and (4) uniform extinguishing performance under all prevailing conditions—summer or winter.

ENGINEERING SOLUTION: War plant engineers found, in Cardox Fire Extinguishing Systems, the solution to each fire problem, large or small.

Engineered application provides a mass discharge of Cardox CO_2: in *pounds* of liquid for small fires, in *tons* for large ones. Added to fast, complete extinguishment is the uniform, enhanced cooling characteristic of Cardox CO_2—through a high yield of CO_2 snow.

As typical in extinguishment by carbon dioxide, there is no damage by the extinguishing medium. Yet, in summer or winter, Cardox CO_2 gives uniform performance—always ready, at 0° F. and 300 psi.

NO SHORTAGE HERE: Since Cardox makes *no* use of high pressure containers—deliveries on which are restricted by WPB Order M233—delivery of Cardox CO_2 is being made *without difficulties* to owners of Cardox Systems by the Cardox fleet of railway tank cars, trucks and trailers.

Today Cardox Fire Extinguishing Systems are making it possible for the Armed Forces of America and its allies to have MORE planes, guns, tanks, ammunition. If you would like to know more about performance of Cardox Systems, write on your company letterhead for Bulletin 853.

CARDOX CORPORATION
BELL BUILDING, CHICAGO, ILLINOIS
District Offices in New York • Washington • Detroit
Cleveland • Atlanta • Pittsburgh • San Francisco
Los Angeles • Seattle

. . . because of this: the Cardox Fire Extinguishing System, known to management and employees by this identifying Pushbutton Station.

It signals that the Cardox System will detect and extinguish fire through the automatically controlled system.

It means also that, by pushing a button, an employee can extinguish a fire—even before it is "picked up" by the fire detectors.

How CARDOX Protects War Production

- **Individual applications engineered to each hazard, all part of one complete system, discharge Cardox CO_2 in *mass* volume and high rate of flow that . . .**
- **Knocks out fire *immediately* by cold, inert carbon dioxide which cuts oxygen concentration below combustion requirements and cools fire zone below re-ignition temperature . . .**
- **Without damage from the extinguishing medium and without residue to delay production operations *after* extinguishment . . .**
- **Supplied instantly from a central Storage Unit maintaining as many tons as necessary of Cardox Liquid CO_2 at controlled low temperature and pressure for uniform extinguishing performance under all prevailing conditions, summer or winter, indoors or out.**

ENHANCED COOLING EFFECT · CENTRAL STORAGE UNIT · AMPLE CO_2 RESERVE · ENGINEERED SYSTEMS · AUTOMATIC

CARDOX

NON-DAMAGING FIRE EXTINGUISHING SYSTEMS

FOR BETTER CUTTING

Switch to

THESE FIRTHITE GRADES FOR BETTER CUTTING AND TO SAVE SCARCE TANTALUM

FOR STEEL CUTTING—These FIRTHITE Tungsten-Titanium Carbide grades stay sharp longer, cut faster, and make smoothest finish. They are described in FIRTHITE Price List FE-105 . . . or, a FIRTHITE Engineer will gladly discuss them in your plant.

FIRTHITE

TITANIUM GRADES FIT "WAR" NEEDS

T-04-HEAVY DUTY
(CONTAINS NO TANTALUM)

FIRTHITE T-04—for coarse feeds, heavy and interrupted roughing cuts. Closest approach to a **universal grade.**

TA-GENERAL PURPOSE
(CONTAINS NO TANTALUM)

FIRTHITE TA—for general-purpose cutting tools on **all** types of **steel** in high-speed production.

T-16-FAST FINISHING
(CONTAINS NO TANTALUM)

FIRTHITE T-16—for light, rapid finishing of **harder** steel, shells, etc.

T-31-PRECISION WORK
(CONTAINS NO TANTALUM)

FIRTHITE T-31—for lightest, fastest, shallow cuts. Recommended for **precision** boring, etc.

Firth-Sterling
STEEL COMPANY

Offices: McKEESPORT, PA. - NEW YORK - HARTFORD - PHILADELPHIA - CLEVELAND - DAYTON - DETROIT - CHICAGO - LOS ANGELES

FIRTHITE TUNGSTEN-TITANIUM CARBIDES

Question every fastening job

Mobile Refrigeration, Inc., Long Island City, New York, chooses P-K Self-tapping Screws for Assembly of Several Different Materials

1. Type A — Driven through steel angles into Masonite housings.
2. Type A — Four screws in each of three adjustable hinge plates hold up a 350 lb. door. Fastening is steel plate to birch.
3. Type A — Two screws in each of three hinge butts. Fastening is steel plate to birch.
4. Type A — Two screws in each of three adjustable door fasteners. Fastening is steel plate to birch.
5. Type A — Fasten frame for door glass. Driven through steel into birch.
6. Type A — Hold door armor in place. Driven through steel into birch.
7. Type Z — Fasten chamber unit to base casting. Driven through Masonite into ⅛" angle iron.
8. Type Z — Fasten steel baffle plate to steel angles. These screws are silver coated to withstand extreme testing temperatures.

260 TAPPING OPERATIONS ELIMINATED ON EACH UNIT-

Man-hours and tools saved—Assembly made stronger with P-K Self-tapping Screws

Assembly of this high altitude test-and-calibration-chamber for aircraft and electronic instruments was greatly simplified, and the product made stronger, when the maker wisely "questioned every fastening".

Of more than 500 fastenings required, about half are metal-to-metal, for which machine screws were formerly used. When these were replaced by P-K Type "Z" Screws, 260 tapping operations were eliminated. Since P-K Self-tapping Screws tap their own strong threads as they are driven, one easy operation completes the fastening. They save the man-hours used up in tapping . . . they also eliminate grinding, breakage and replacement of hard-to-get taps.

Assembly of the unit also involves a large number of metal-to-wood and metal-to-Masonite fastenings. Experiments showed that P-K Type "A" Screws would afford much greater security than the conventional wood screws which had been used. Stronger fastenings result because P-K Type "A" Screws are threaded all the way to the head, and are uniform in dimension.

War production needs all the man and tool hours P-K Self-tapping Screws can save. Question every fastening job in your plant . . start now! Call in a P-K Assembly Engineer to help you search out *all* opportunities to apply P-K Self-tapping Screws. Or, mail assembly details for recommendations. Parker-Kalon Corp., 194-200 Varick St., New York.

A TYPE FOR EVERY METAL OR PLASTIC ASSEMBLY

PARKER-KALON

Quality-Controlled

SELF-TAPPING SCREWS

Give the Green Light • to War Assemblies

Bronze Sleeves and Bearings

THAT ARE TRUE TO SIZE ...GIVE LONGER SERVICE

COMPLETE MACHINING FACILITIES

We have a modern shop, completely equipped for boring, turning, facing, honing, grooving, threading, milling, etc. Centrifugal casting requires less allowance for finish—which means less wastage of material and lower machining costs.

SLEEVES, bearings, rings and other products cast *centrifugally* by Shenango-Penn, are now serving in every branch of industry and delivering long trouble-free service. Engineers find that the centrifugal process assures castings of greater strength . . . castings that are free from sand inclusions and blow holes . . . castings that can be depended upon for close, accurate sizes.

Shenango-Penn facilities permit production of sleeves as large as 26″ O. D. and up to 26 ft. in length. Why not write for a copy of our Bulletin No. 143 and see the many economical applications possible with centrifugal casting?

SHENANGO-PENN MOLD COMPANY
410 West Third Street, Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO-PENN

ALL BRONZES • MONEL METAL • ALLOY IRONS •

ARMY E NAVY

To

AMERICAN FOUNDRY EQUIPMENT CO.

"FOR GREAT ACCOMPLISHMENT IN THE PRODUCTION OF WAR EQUIPMENT"

WE PAY sincere tribute to the zeal and patriotism of our employees, and to the cooperation of our customers, business associates and suppliers for having been presented the Army-Navy "E" Production Award on April 16.

This distinguished honor makes us aware, even more than ever, of the responsibilities with which we have been entrusted.

We shall fly the "E" flag proudly as an emblem of work well done—and as a reminder and challenge to still greater achievements until final and complete Victory is won.

WAR DEPARTMENT
OFFICE OF THE UNDER SECRETARY
WASHINGTON, D. C.

March 20, 1943

To the Men and Women
of the American Foundry Equipment Company
500 South Byrkit Street
Mishawaka, Indiana

This is to inform you that the Army and Navy, on the recommendation of the War Production Board, are conferring upon you the Army-Navy Production Award for great accomplishment in the production of war equipment.

This award symbolizes your country's appreciation of the achievement of every man and woman in the American Foundry Equipment Company. It consists of a flag to be flown above your plant and a lapel pin which each of you may wear as a sign of distinguished service to your country.

I am confident that your outstanding record will bring victory nearer by inspiring others to similar high achievement.

Sincerely yours,

Robert P. Patterson,
Under Secretary of War

Products Being Cleaned By the *Airless*
WHEELABRATOR

- AIRCRAFT EQUIPMENT.
- ARMAMENT.
- TANK PARTS.
- NAVAL EQUIPMENT.

We Are Proud and Grateful for This High Honor . . . and Accept the Challenge to Even Greater Achievement

TRADE MARK

AMERICAN FOUNDRY EQUIPMENT CO.

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Advertisement

MAY, 1943

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

Cold Heading Offers Means of Producing High-Strength Parts

The cold heading process, long established as an effective, economical means of producing bolts and other parts with excellent mechanical properties, is gaining in favor as the result of the introduction of new alloys especially adapted for fabrication by this process.

Outstanding among these newer alloys is Duronze V, a silicon bronze which is characterized by unusually high tensile strength after cold working, yet which retains an exceptional degree of malleability in the hard drawn condition. This combination of high strength and malleability after cold working is an important factor in the production of parts by the cold heading process.

Duronze V hard drawn wire can be cold headed and roll threaded into bolts with an average tensile strength as high as 120,000 pounds per square inch, without the need for any intermediate anneals or relief heat treatment. As an additional advantage, Duronze V is not subject to season or corrosion cracking, so that parts made from it can be successfully used in outdoor service.

Memos on Brass—No. 38

The addition of lead to the copper-zinc alloys results in a substantial improvement in machinability, and for this reason leaded brass rod is used in large quantities for the production of screw machine parts. While lead additions also tend to decrease ductility, careful control of the composition of the alloy effects the most desirable compromise between ductility and machinability.

This red hot billet of brass is headed for battle. When it arrives, in the shape of fighting equipment, it will be prepared to give an excellent account of itself. For this war-born brass, produced with the modern war-built equipment here at Bridgeport, is keyed to fill the most rigid demands of wartime fabrication, and effective use by our armed forces.

Special Methods Recommended for Machining Duronze III

Speeds of feed and spindle; cutting tools; rake and clearance angles; lubrication and cooling, are all important to results

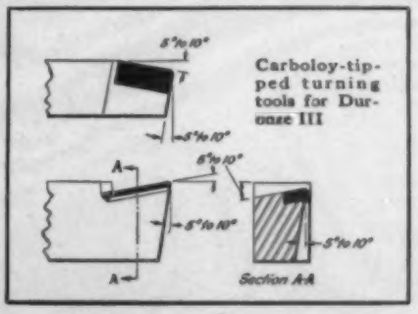
As Duronze III rod finds more and more acceptance in industry, new users of this alloy are calling for specific instructions as to the most efficient screw machining practice.

Perhaps it is best first to describe briefly the composition and physical properties of Duronze III. This is a rod alloy containing approximately 91% copper, 7% aluminum and 2% silicon. It is therefore classed as an aluminum bronze which has been hardened and strengthened by the addition of silicon. It is stronger than brass rod, about 90,000 pounds per square inch in tensile strength as compared to about 60,000 pounds per square inch for brass screw machine rod. It is also harder, tougher, and more corrosion-resistant than most alloys. Duronze is free cutting since its chips break up readily. Nevertheless, being hard and strong, it is more difficult to machine than free cutting brass.

An operator, machining it for the first time, generally cuts it with the same tools as designed for brass but reduces the speeds of both the spindle and feed as used for brass. He may find that the work heats up and varies in dimension while tool life is not as long as expected.

Cooling Work Most Important

Cooling the work quickly and completely will probably eliminate most troubles. It is therefore necessary to provide greatly increased flow of cooling oil so that tools and work are flooded from all directions. As work leaves the machine, it should be *cold* to the touch. To obtain this condition, it may be necessary to use more than two streams of oil. Any cutting compound containing paraffin base oil or even straight paraffin oil is satisfactory as a lubricant and coolant.



Carboloy-tipped turning tools for Duronze III

Turning and Forming

For these types of operations, it has been found necessary to use Carboloy-tipped tools. These tools demand less attention, give longer life and best production. A spindle speed of about 50% and a feed of about 75% of that used for free turning brass is suitable for long runs. These can be varied somewhat, depending on the type of job or difficulty of the operations. The tools must be kept sharp and should be ground so as to have about a 5 to 10 degree back rake, cutting and clearance angles. Two tool grindings per 8-hour day are generally sufficient on long production runs, provided that work and tools are kept cool. This is very important as excessive heat tends to burnish the edge of the tools.

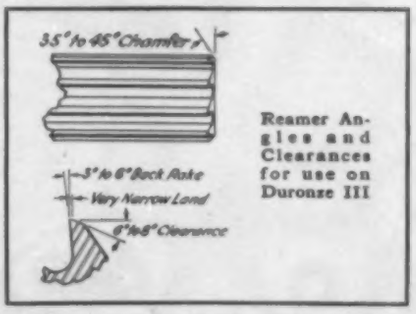
Drilling and Reaming

For drilling operations high speed drills should be used that have large flutes which would allow for ample chip clearance. Speeds and feeds should be about 50% to 75% of those used for free turning brass. Clearance, point angles, etc. as commonly furnished by drill manufacturers are satisfactory. Where exact size holes are required in thin wall parts, it is best to ream the hole to size. This can be done with a standard reamer, ground so as to have 3 to 6 degree back rake with a very narrow land and a 6 to 8 degree clearance.

Tapping

A gun type tap with a radial lip should be used for through holes as this type of tap throws the chip ahead of the tap and eliminates any clogging of the flutes and the danger of damaged threads. A slight rake angle of 5 to 8 degrees is desirable and the land on the chaser should be backed off.

(Continued on Page 2, Column 2)



Reamer Angles and Clearances for use on Duronze III

COPPER ALLOY BULLETIN

CAUSES OF CORROSION

This article, the second of two dealing with impingement corrosion, is the seventh in a series of discussions by C. L. Bulow, research chemist at Bridgeport Brass.

IMPINGEMENT CORROSION *(Cont.)*

In the April issue we dealt with impingement corrosion brought about by a stream of entrained gases striking a tube surface, resulting in the formation of characteristically clean almond or crescent shaped pits. Through an error, it was stated that, "The pit is undercut on the upstream side and sometimes with a noticeable tail pointing downstream, as shown in Fig. 1." Although the illustrations were correctly drawn the written description should be corrected as follows: "The pit is undercut on the *downstream* side and sometimes with a noticeable tail pointing *upstream*."

Frequently an examination of a corroded condenser tube will reveal the presence of a thick scale beneath which are: (1) some pitted areas covered with various copper compounds; (2) other areas covered with a layer of bright crystalline metallic copper; (3) still other areas consisting of clean impingement type pits; (4) impingement type pits filling up with scale and debris and changing back into oxygen concentration cells; and (5) areas covered with a thin film beneath which only slight etching of the metal can be detected.

It is for this reason that full lengths of condenser tubing are required for a reasonably good diagnosis of any given corrosion problem. The *top* and *inlet* ends of the tubes should be identified with suitable marks before the tubes are removed from the condenser or heat exchanger.

Variations in Operating Conditions

In impingement corrosion, another complicating factor is the water velocity and quantity of entrained air which vary considerably from tube to tube within any given unit. For example, a condenser having an average water velocity of approximately 6 feet per second may have water flowing through some tubes at rates as low as 2-3 feet per second, and through others at rates as high as 9-10 feet per second.

Under these conditions, one would expect to find tubes with evidence of all types of corrosion in the same condenser. Condenser tube users frequently confirm this with the statement that tubes located in certain portions fail repeatedly, whereas in other portions longer life is obtained.

Instances have been reported where large pieces of stone or coke lodged in a condenser tube resulting in increasing the water velocity between the obstruction and the tube wall producing severe impingement corrosion (localized metal-ion concentration cell). 70-30 Cupro Nickel, 5% Aluminum Bronze (Duronze IV), and Aluminum Brass have shown good resistance to impingement corrosion, both in laboratory tests and in actual service. The good impingement corrosion resistance of these alloys is believed to be due to the strength and self-healing characteristics of the thin corrosion films which form when the alloy is subjected to the corrosive action of a stream of water containing entrained gases.

All of these considerations make the problem of combating condenser tube corrosion a difficult one, since a single tube in a given condenser may be called upon to resist all these types of corrosion. This is an involved task, since it means that the tube must then of necessity resist: (1) deposit attack (oxygen concentration cells); and (2) impingement attack (metal-ion concentration cells) and possibly other types.

How to Prevent Season Cracking

The season cracking of yellow brass can usually be prevented by an understanding of its causes, which indicate the steps necessary to correct the condition. Because of the recurrence of this problem, readers of the COPPER ALLOY BULLETIN may be interested in reviewing the summary which appeared in the May 1940 issue. Copies of this issue are available without charge.

Machining Duronze III

(Continued from Page 1, Column 3)

For threading blind holes, the regular spiral type 3 fluted tap is satisfactory.

One of the most important points to be remembered in forming good threads by tapping is to have the proper size hole for the tap used, as a great deal of trouble is experienced if too small a hole is drilled, because of the greater power necessary to tap the hole, which might cause broken taps, and the fact that too much material is being removed, causing torn threads.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A tube machine is said to be adaptable to squaring, burring, flaring, and beading operations on non-ferrous tubing in sizes ranging from ¾ inch to 1½ inches outside diameter. It is said that the machine can be quickly prepared for performing any of the operations for which it is suitable. **(No. 441)**

Colored bands can be printed on cylindrical parts for identification purposes by means of a new machine, according to the manufacturer. Machine has an input gravity feed chute in which the parts to be marked are deposited by hand. From the chute parts roll onto the printing unit. Interchangeable synthetic rubber type is used for the printing, together with liquid inks which dry quickly, it is claimed. **(No. 442)**

Precision depth measuring is made possible by means of a new gage which is intended for use with a 2-inch micrometer, it is reported. Gage is said to make possible the quick, accurate determination of depths which would otherwise have to be measured with a depth micrometer. Maker claims that the unit can be used anywhere that a depth micrometer can be used, as well as in many applications where the long barrel of a depth micrometer would make it difficult to use. **(No. 443)**

Wiping and polishing sheets are described as being made of closely textured cellulose fiber, which is soft, non-abrasive, and suitable for use on metal surfaces. For polishing service, cloth can be used with most waxes, oils, and solvents without disintegrating or linting. It is intended to be discarded after one use. **(No. 444)**

A washing machine for small parts is designed for parts which can withstand slight tumbling action. Work is tumbled on an endless belt to expose all surfaces to powerful sprays. Unit is available for heating with steam, gas, or electricity, and can be provided with full automatic controls, according to the manufacturer. It is said to be possible to arrange for the use of two solutions, such as a washing solution and a fresh water rinse. **(No. 445)**

A solder iron stand is said to facilitate production soldering operations on all types of small assemblies. Its use permits operator to use both hands for handling work, and a magnifying unit is included to give an enlarged view of the entire operation. Fumes are carried away through a large chimney to contribute to the comfort of the operator. It is said that the center of gravity of the unit is sufficiently low to prevent tipping when mounted on bench. **(No. 446)**

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,* for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers, oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

"Bridgeport" Brass Co.

COPPER WATER TUBE—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

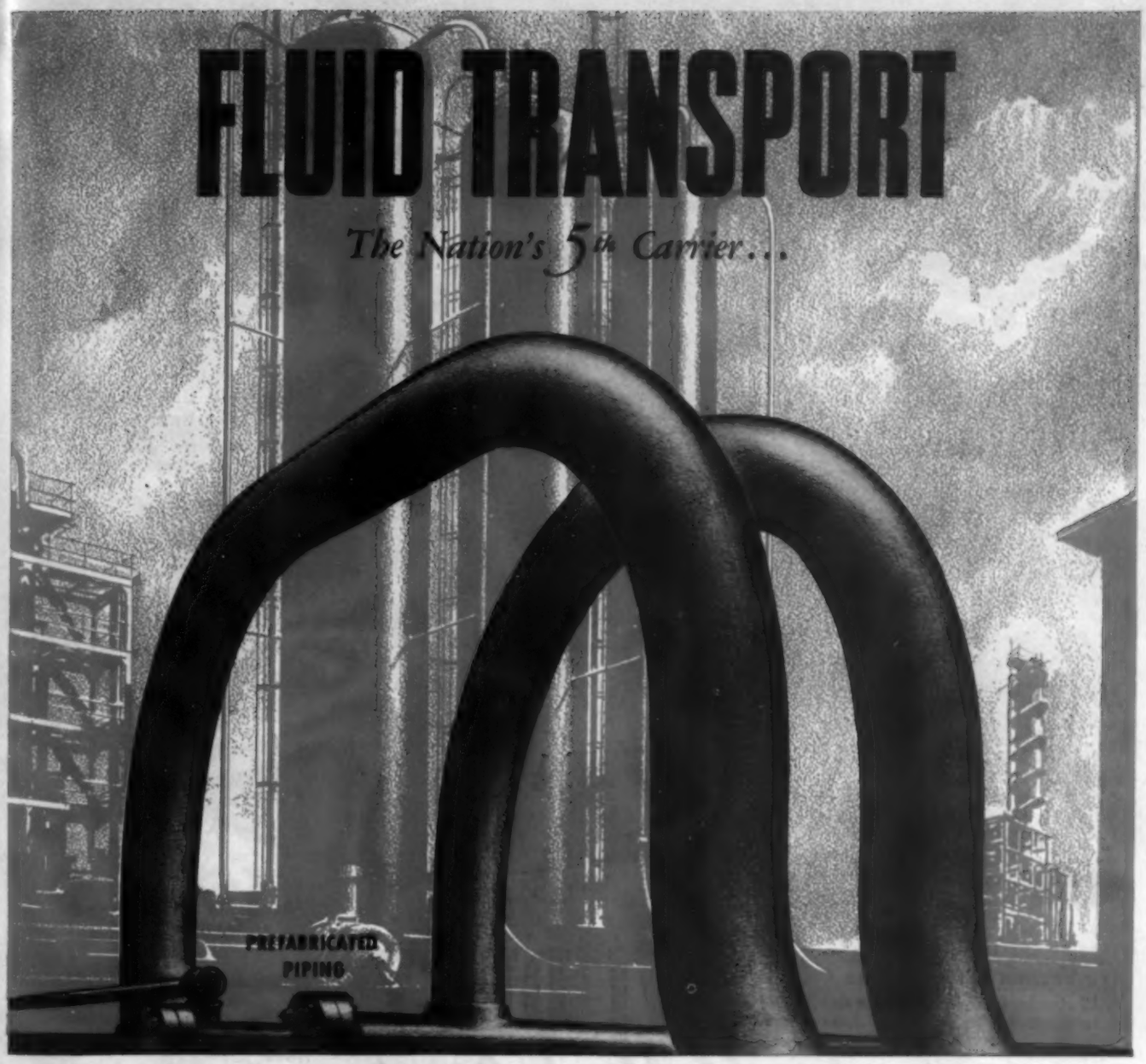
BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

Established 1865

BRIDGEPORT BRASS

Note: Bridgeport products are supplied in accordance with existing priority regulations.

*Trade-name.



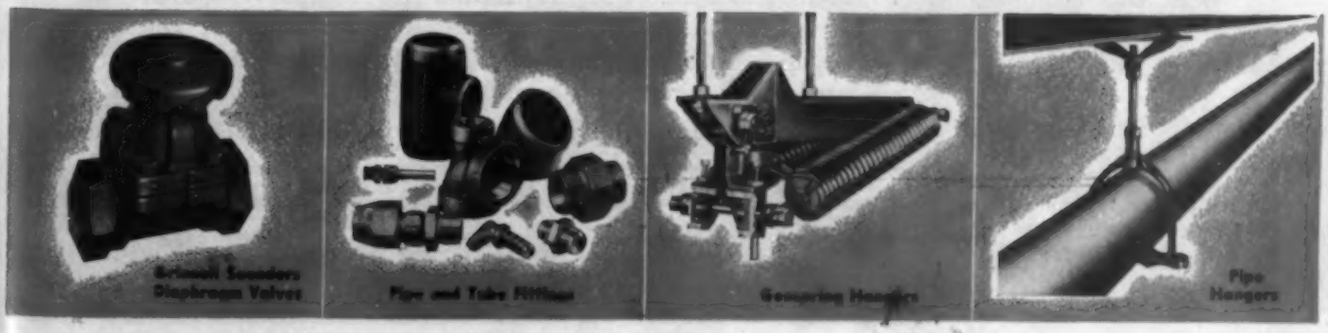
REMOVE THE PIPING FROM A PETROLEUM REFINERY and what have you left? From well to tank car an unfathomable maze of piping provides FLUID TRANSPORT.

Here, as in scores of other industries, the piping formula is made up of such components as: materials to be carried, heat, cold, expansion, contraction, pressure and corrosion. Grinnell provides the specialized engineering combined with the manufacture and fabrication of the many connecting links needed to convert a pile of pipe into a complete *piping system.*

For war construction, or maintenance and repair of existing piping, call Grinnell Company, Inc. Executive offices, Providence, R. I. Plants and offices throughout United States and Canada.

GRINNELL

WHENEVER **PIPING** IS INVOLVED

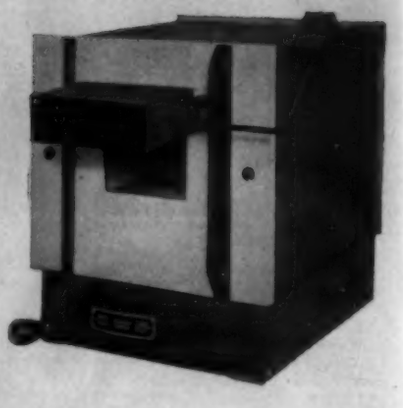


Multiple Unit Muffle Furnace

4 standard sizes, used with detached rheostat—for drying precipitates — ash determinations — ignitions—heat treating, etc. up to 1850° F. (1010° C.)

Multiple Unit Organic Combustion Furnace

Sections four, eight, and twelve inches long—each with separate rheostat control —operations up to 1832° F. (1000° C.)— an outstanding achievement for accuracy and comfort in operation.



Multiple Unit Muffle Furnace

3 standard sizes with built-in rheostat — same uses and temperatures as the other described muffle furnace.

Multiple Unit Solid Combustion Tube Furnace

10 standard sizes—for carbon determinations and special heat treating operations up to 1950° F. (1065° C.)

Multiple Unit Hot Plate

7 standard sizes—each with three heats—for evaporating solutions—drying precipitates—distilling, boiling, etc. Maximum temperature 750° F. (400° C.)

Multiple Unit Hinged Combustion Tube Furnace

10 standard sizes—for carbon determinations—special organic analyses and special heat treating applications up to 1950° F. (1065° C.)

HEVI DUTY
Multiple Unit
LABORATORY FURNACES

Multiple Unit Crucible Furnace

5 standard sizes — for melting small quantities of metals—pyrometer calibration—molten salts and heating all materials, when contained in crucibles, up to 1950° F. (1065° C.)

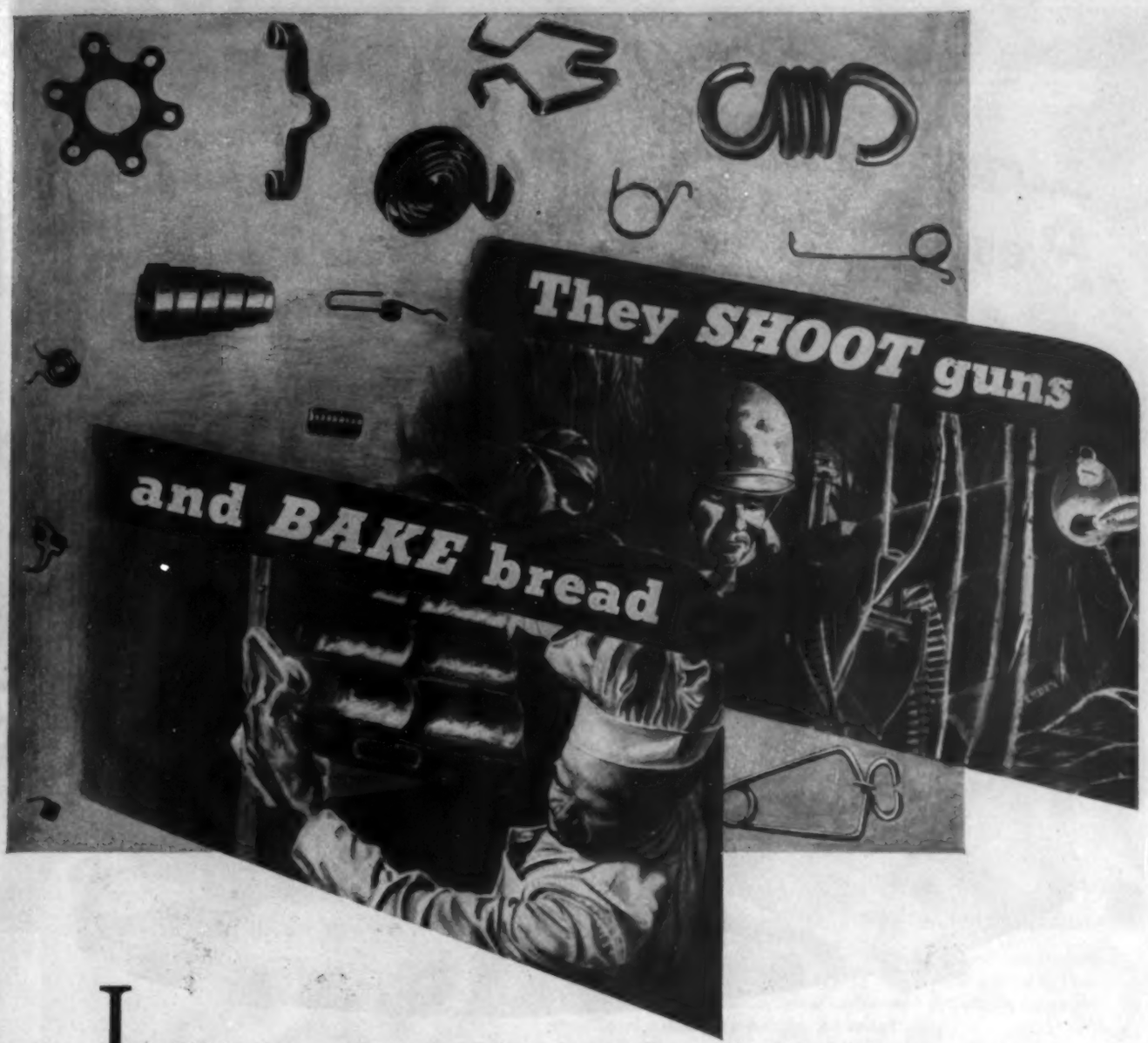
The seven examples of Multiple Unit Laboratory heat treating equipment shown have been used extensively for thirty years, providing types for all laboratory furnace and hot plate requirements. Each type of Multiple Unit equipment has the exclusive feature of a multiple number of heating units, each readily replaceable by the user. This results in economy and uninterrupted operation.

Ask your laboratory supply dealer or send for laboratory furnace bulletins.

HEVI DUTY ELECTRIC COMPANY

LABORATORY FURNACES MULTIPLE UNIT ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN



IF IT'S automatic operation in any application, Barnes-made springs are on the job — taking the "socks" of repeated use. Never before have mechanisms been put to harder service — working faster — more hours. It's a job for good springs — for no mechanism is better than its spring. That springs can absorb this extra duty is due mainly to a thorough knowledge of their potentialities. Even the simplest spring can be a powerhouse of almost perpetual motion.

Barnes-made Springs

ENGINEERED PEP AND POWER

WALLACE BARNES COMPANY

DIVISION OF THE ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

Airplane parts pressed faster

Outstanding among the features of this 2000-ton Birdsboro Hydraulic Airplane Press is the highly *practical* design of its turret table.

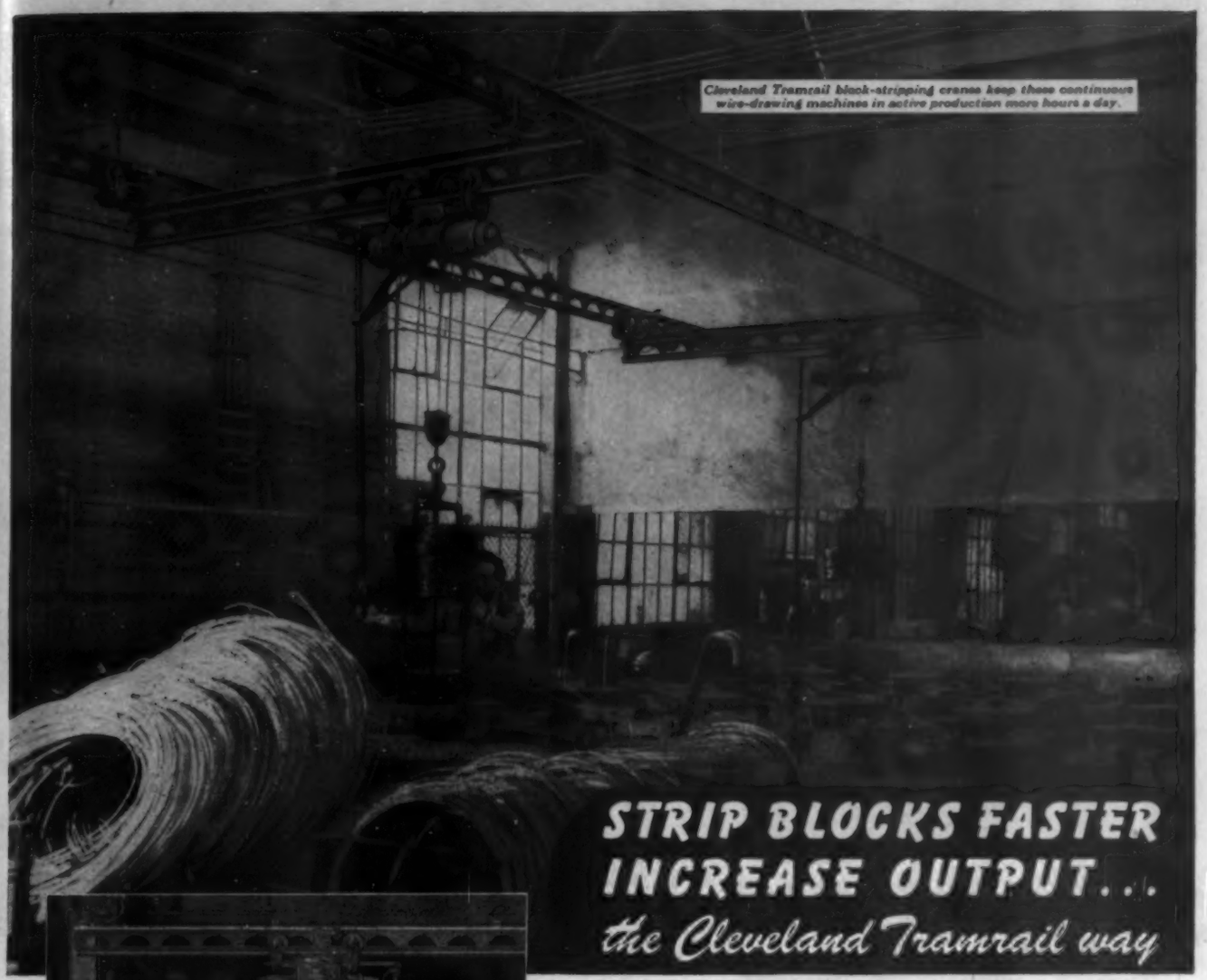
This assures easier, faster, more convenient loading and unloading. This press also provides No-Jar turret indexing and Two-Stage pressing speed — for the smooth operation and great accuracy that give maximum production of airplane parts with a minimum of rejects.

This turret table press is another of the many Birdsboro installations that are now working 24 hours a day on the war program. And when peace-time comes again they will continue to make their contribution in shaping a new America. If yours is a press problem, it pays to consult Birdsboro.

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY, BIRDSBORO, PENNSYLVANIA

BIRDSBORO

HYDRAULIC PRESSES



Cleveland Tramrail block-stripping cranes keep these continuous wire-drawing machines in active production more hours a day.

STRIP BLOCKS FASTER INCREASE OUTPUT...

the Cleveland Tramrail way

The various kinds of special heavy wire and high tensile wire drawn on this motor block are easily and quickly stripped with the Cleveland Tramrail crane.

Many mills in the United States and Canada have installations of Cleveland Tramrail block-stripping cranes and carriers. They are stripping draw blocks faster and keeping them in operation more hours a day, thus stepping up output.

Smooth rolling Cleveland Tramrail equipment has been especially designed for this service. It allows a man to take care of more blocks and draw heavier bundles. Older experienced men can usually keep pace with younger fellows when this equipment is provided.

The equipment consists of a hand-propelled crane or carrier with an electric hoist. The crane or carrier is easily pushed on its ball-bearing wheels by means of the rigid arm attached to the carrier. Push buttons, conveniently located in the handle at the lower end of the arm, control the hoist.

Cleveland Tramrail overhead materials handling equipment has been developed to serve every department in rod and wire mills.

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BOOKLET No. 2006. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
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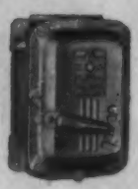
CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

FOR THOSE DANGER SPOTS IN WAR WORK



DANGER *Acetone*

"De-ion" Motor Watchman for manual motor starting.
(Class I and II hazardous locations.)

DANGER *Naphtha*

"De-ion" Linestarter for magnetic across-the-line motor starting.
(Class I and II hazardous locations.)

DANGER *Coal Dust*

"De-ion" Combination Linestarter for circuit protection and magnetic motor starting.
(Class II hazardous locations.)

DANGER *Gasoline*

Oil-immersed "De-ion" Linestarter for use in corrosive and explosive atmospheres.
(Class I hazardous locations.)

. . . use Westinghouse "De-ion" Controls for hazardous locations

Controls for motors must "make" and "break" circuits safely in spite of explosive atmospheres in ammunition plants, chemical, oil refining and other war industries. Production must be kept moving . . . and safely!

That calls for Westinghouse A-C Motor Control specifically designed for the job.

Cast-iron or welded steel enclosures with heavily reinforced sections and wide sealing flanges are designed in accordance with Underwriters' Laboratories specifications for Class I, Group D and Class II, Groups F and G hazardous locations.* For those applications where it is necessary to resist the effects of corrosive as well as explosive atmospheres, the Westinghouse line includes many combinations which are totally oil-immersed. These are designed in accordance with Underwriters' Laboratories specifications for Class I, Group D hazardous locations. Other design features keep maintenance at a minimum, provide complete accessibility when necessary.

Whether for replacement or for new installations in hazardous locations, specify Westinghouse Controls. Call your Westinghouse representative for his recommendations. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-21271

★ ★ ★

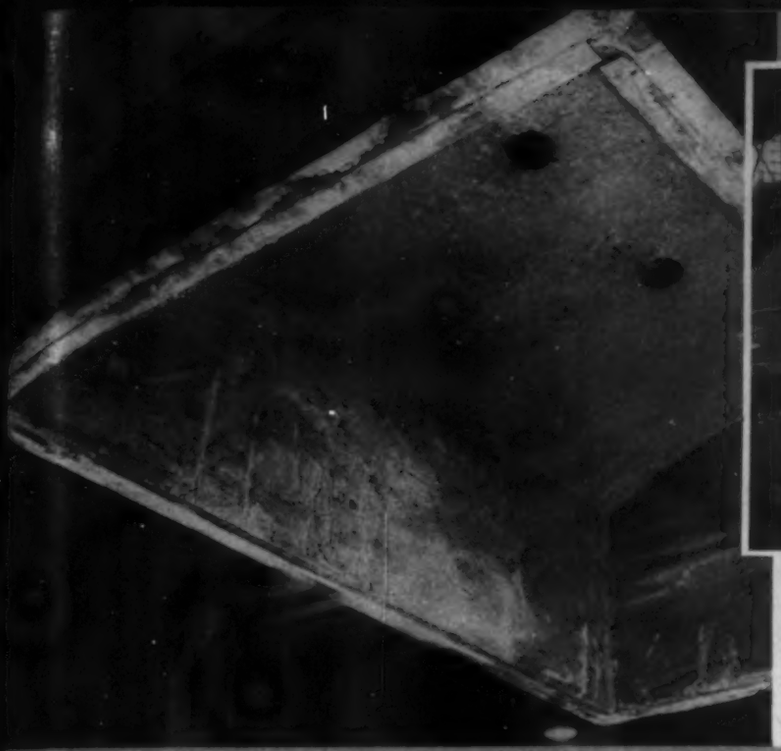
*Class I, Group D hazardous locations are those in which the atmosphere contains gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors, or natural gas.

Class II, Group F and G locations include those in which grain dust, carbon black, coal, or coke dust is present in sufficient quantities to produce explosive mixtures.

Westinghouse

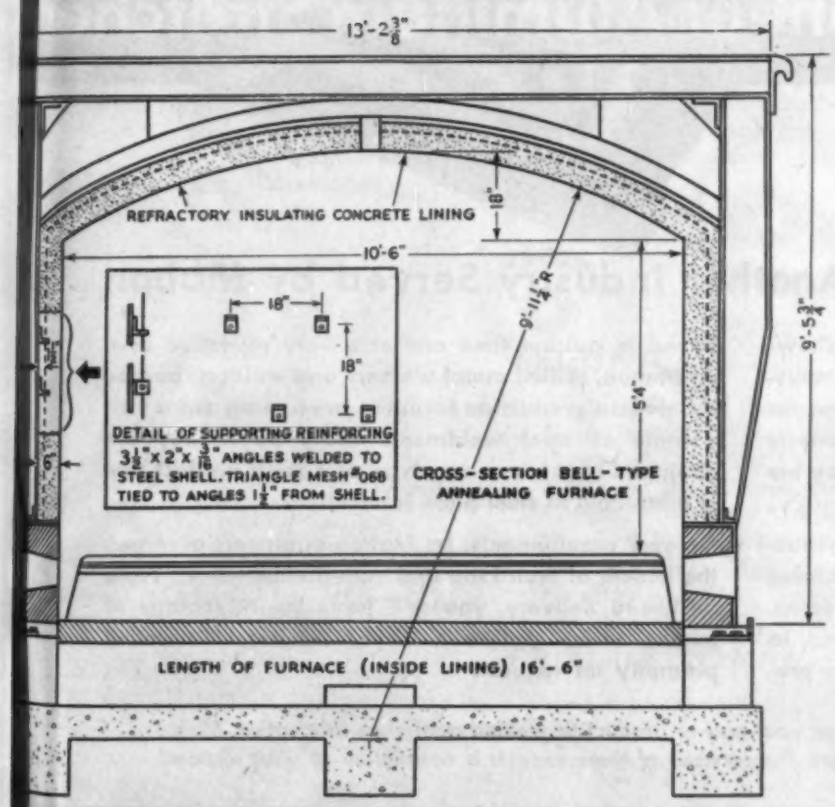
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MOTORS AND CONTROL



LUMNITE-lined Bell-type Annealing furnace. *Left*, close-up of cover ready to be lowered into place. *Directly above*, outside view of one of the twelve furnaces, all of which are lined with Refractory *Insulating* Concrete.

JOINTLESS, LIGHT-WEIGHT LINING SAVES HEAT IN BELL-TYPE ANNEALING FURNACES



Refractory *Insulating* Concrete Speeds Installation, Reduces Maintenance

The first of 12 annealing furnace covers in a large steel mill was lined with Refractory *Insulating* Concrete, made with LUMNITE, about two years ago. The cover pictured here has been in use just about a year. In addition to low first cost, the linings offer these advantages:

EASE OF INSTALLATION—The furnace cover is inverted. The mixture of LUMNITE, refractory-insulating grog and water, is cast in place. Arch is placed first; then forms are set and side and end walls are cast.

SAVINGS IN MAINTENANCE—The monolithic lining resists the strain and shock of lifting and dropping in place. There are no joints to loosen or small units to drop out.

SAVINGS IN OPERATION—Absence of joints increases efficiency of insulation. Low heat-storage and low conductivity save fuel in reaching and maintaining furnace temperature.

Refractory Concrete and Refractory *Insulating* Concrete, both made with LUMNITE, are meeting the wartime needs of many steel mills. We offer the help of our representatives in making the most efficient use of LUMNITE, which is now available only for service in essential war production. The Atlas Lumnite Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

LUMNITE FOR REFRACTORY CONCRETE

Mahon Fabricated WELDMENTS

Frame Section For Sheet Aluminum Stretcher

ALUMINUM

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STEEL

The Magazine of Metalworking and Metalproducing

MAY 10, 1943

Volume 112 *Number 19*

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NICKEL AIDS THE AERONAUTICAL INDUSTRY

to KEEP 'EM FLYING!

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THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall St., New York, N. Y.*

STEEL
May 10, 1943

RESENTMENT BREWING: At this writing the situation in the coal fields still is indefinite. Nothing has been decided beyond recall. No showdown has occurred. About the only safe conclusion one can draw upon the basis of developments to date is that there are more ways than one to skin a cat.

President Roosevelt set out to keep the coal mines operating. He has succeeded, but not before Mr. Lewis had been able to demonstrate quite effectively the power he holds over the miners. Mr. Lewis set out to get more money for the members of his union. He will win this objective, at least in part.

The whole procedure is distasteful. Each principal may be sincere according to his own lights, but in cold reality both are shadow boxing. The real pity is that neither has dealt fairly with the public interest. Political expediency deters the President from acting as forthrightly as national welfare demands. Thirst for power and zeal for the miners' interest prevents Mr. Lewis from recognizing the rights of the public.

These defections from high purpose will not pass unnoticed by the people. Deep down in the hearts of uniformed men abroad and quiet men and women at home is resentment which will not be dissipated easily or soon. That resentment already is finding its way into the minds of senators and representatives. Some day it will strike out fiercely in the form of votes for a federal administration which will put the interest of the public ahead of that of minority pressure blocs.

• • •

SAVING 64 PER CENT: In connection with the present necessity for conserving materials, manufacturers cannot afford to overlook the possibilities in bolts and cap screws. In many applications, small-diameter heat-treated bolts of carbon steel can do the work of alloy steel bolts or of larger-diameter carbon steel bolts not heat treated.

For instance, a ¾-inch bolt of carbon steel not heat treated has a breaking strength of about 24,000 pounds, equivalent to about 75,000 pounds per square inch ultimate strength in the metal. A ½-inch carbon steel bolt, properly heat treated, will show a breaking strength of 24,000 pounds and an ultimate strength of about 150,000 pounds per square inch.

Having the same breaking strength, the ½-inch heat treated bolt (p. 86) can be used to replace the ¾-inch untreated bolt. A million ½ x 6-inch bolts require 175 tons of steel, whereas a million ¾ x 6-inch bolts take 430 tons—a saving of 255 tons due to using heat treated bolts of smaller diameter.

If one were to use heat treated nuts with the ½-inch bolts, 190 tons of steel would be required per million bolts and nuts. A million ¾-inch untreated nuts and ¾ x 6-inch untreated bolts would require 530.5 tons of steel. The saving in this case is 340.5 tons, or 64 per cent. In times like these, savings of this proportion are well worth the attention of every alert manufacturer.

• • •

NO EASING IN SIGHT: Hope that the situation in critical materials might ease in the near future is given a jolt by reports issued during the past week. Donald Nelson's statement on the output of munitions for March, coupled with the WPB size-up of the requirements of government agencies for steel, copper and aluminum in the third quarter, is a bit disquieting.

The production of munitions in March was moderately greater than in February (p. 52), but the gain was due chiefly to the fact there were more working days in March than in February. Mr. Nelson's report carried the hint that munitions output is approaching the point where it will be limited to a considerable degree by the amount of steel available.

This sobering conclusion is corroborated in part by the outlook as to supply and demand in the third quarter. According to WPB officials (p. 61), the various government agencies figure that they really need 20,000,000 tons of steel in the quarter ending Sept. 30. This is supposed to be a conservative figure, arrived at after a careful scaling down of original estimates. However, the steel available for delivery during the period probably will not exceed 15,000,000 tons. Consequently, the agencies' de-

(OVER)

mands must be whittled down by an average of 25 per cent. Similar curtailments must be made in the demands for copper, aluminum and some other materials.

If the government's figures are reasonably accurate, the situation is not at all reassuring. In fact, it argues strongly for a renewed effort to increase efficiency in production and for a more intensive drive for conservation in the use of materials. Between the two expedients, industry might effect gains to the equivalent of two or three million tons of material in a quarter, without adding to capacity. This may seem to be an optimistic figure, but we believe it is possible of achievement.

• • •

CALIFORNIA TANKS: STEEL's Detroit editor, A. H. Allen, is being exposed to the intense enthusiasm of Californians for the opportunities awaiting the West Coast industries in the postwar period. In an extended tour of the Pacific states, he is studying the region's participation in the war effort and analyzing the factors which will figure in the economic development of the area after the war.

Mr. Allen's reference to General Motors production of M-5 tanks (p. 65) will surprise some easterners. That more than 50 per cent of the cost and 61 per cent of the weight of the tanks comprises materials or supplies made or purchased in Los Angeles speaks volumes for the extent to which industrial facilities have been developed in Southern California in recent years.

• • •

WOMEN IN INDUSTRY: Every new turn of events in Washington points to a year of greater hardship than has been experienced thus far in this war. Civilians will have to put up with numerous inconveniences. Industry—even that portion of it engaged 100 per cent in war work—must get along with more inexperienced employes.

This prospect raises the pertinent question as to what extent producers and manufacturers can employ women on jobs which normally are filled by men. A quick survey of widely scattered plants indicates a surprisingly sharp variation in policy as to the employment of women. One company may have as many women as men on its payroll. Another, engaged in an almost identical line of business, may have no women employes except in the offices.

As the manpower situation becomes more acute, employers who thus far have refrained from hiring women for shop work will be forced to alter their policy. Many of them will find that the introduction of female labor will be attended with fewer complications than they anticipate.

STEEL's Buffalo correspondent has just reviewed the role of women in the operations of Bethlehem and Republic plants in the Buffalo district. He finds that women are giving good accounts of themselves (p. 51) in gas cutting, as crane operators, machine shop and power house helpers, chainmen or hookers, inspectors, welders, etc. In general, his report confirms the experience found in numerous other sections where employers are more than satisfied with the manner in which women are filling men's jobs.

Hundreds of plants which to date have relied upon men will be forced to turn to women. It might be well to prepare to shift to this type of worker now—before stern necessity forces a precipitous change in policy.

• • •

TRY SUBSIDIES NEXT? Paul McNutt's call for a 48-hour week in the steel industry, effective July 1, considered in conjunction with the Ickes ruling on a 6-day week in coal mining, virtually writes the death sentence for the "Little Steel" wage formula. Since Jan. 1, 1941, wages for steel workers and coal miners have increased more than the cost of living. The further advances resulting automatically from the lengthening of the work week will widen the gap by an additional margin.

This means that the administration has lost another round in its fight against inflation. In yielding so readily on wages, the government lays itself open to new demands for relief on prices. The familiar upward spiral again is on the move.

Much of this difficulty could have been avoided if the controls had been based upon economic instead of political or social considerations. Now it may be too late to start a new approach through economic channels. The present slow disintegration of weak controls must give way to some other system.

Watch for more emphasis on subsidies. This expedient is distasteful to most Americans, but it may prove to be the only way out of a serious situation.

E. C. Shaner

EDITOR-IN-CHIEF

How To Cut Replacement Costs

and Send More Steel to War

Regular inspections, adequate painting, and frequent lubrication, will cut replacement costs and save steel that is vitally needed in every quarter of the globe by America and her Allies.

Initiate, today, a special wartime inspection service. Examine roofs, siding, and structural members of buildings—especially where atmospheric conditions, or process fumes, result in destructive corrosion. Clean and paint steel that shows signs of deterioration. Consult a reliable paint manufacturer if standard paints do not prove satisfactory.

Many types of manufacturing equipment—trucks, cranes, and the like—operate in and out of doors. Such equipment should not only be painted, but moving parts should be adequately lubricated to save the steel that otherwise would be needed for replacement of parts.

The moving parts of all types of machinery should be regularly inspected to make certain that operators are applying lubricating oils and greases of the correct qualities, and in the right quantities. If undue wear of moving parts continues, ask a lubricant manufacturer for advice.

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Camouflaged Wage Increase Circumvents "Little Steel"

War Manpower Commission order to add $100,000,000 or more to industry labor costs—$300,000,000 in two years. . . Poses operating difficulties for producers

MANDATORY 48-hour week throughout the steel industry and a 6-day week for the coal mining industry, ordered last week by government agencies, are interpreted as thinly-clad circumvention of the "Little Steel" formula of the National War Labor Board.

Effect of the 48-hour week for steel will be to give wage earners a bonus estimated from $100,000,000 to $120,000,000 annually in the form of premium wages for overtime.

Application of the 6-day week in coal mining raises labor costs $75,000,000 a year. It increases the labor cost of mining coal in the Appalachian area from $1.47 a ton under the 5-day week to $1.60.

In both cases the increase in weekly earnings—steelworkers and coal miners—since Jan. 1, 1941, has exceeded the increase in the cost of living. Living costs, according to the National Industrial Conference Board, rose 19.5 per cent from January, 1941, to March, 1943.

During this period, coal miners employed by subsidiaries of the United States Steel Corp. increased weekly earnings from $28.56 in January, 1941, to $47.66 in March, 1943, an increase of approximately 67 per cent.

Steel wage earners in January, 1941, averaged 86.6 cents an hour and worked an average of 39.2 hours a week for an average of $33.85. In March, this year, they earned 110.3 cents an hour and worked an average of 42.2 hours for an average of $46.55. Increase in hourly rates has been 29 per cent and in weekly income about 37 per cent.

The longer work week will widen the discrepancy between the increase in living costs and wages. It also will cause serious operational difficulties for many companies—both steel and coal.

Imposition of the 48-hour week for the steel industry, ordered by War Manpower Commissioner Paul V. McNutt and to become effective July 1, was immediately followed by charges by the iron and steel industry advisory committee that WMC was "pressured" into the action by the Congress of Industrial Organizations. Proposal for the industry-wide 48-hour week was first advanced by CIO President Philip Murray last March.

The industry advisory committee said the order was designed to obtain "concealed wage increases" counter to the anti-inflation program and that it would add $100,000,000 to the industry's payroll "at a time when the government is making every effort to hold back the forces of inflation."

"This increase," the committee said, "would come on top of an actual increase in weekly income of steelworkers which has far outrun the rise in living costs. Over the past year, earnings of steel workers have risen 17 per cent to an average of $44.50 a week. In the same period, the cost of living as measured by recognized authoritative indexes, has increased only 7 per cent."

Pointing out that steel mills now are producing at about 99 per cent of capacity on an average week of 42 hours—with many workers in primary operations on a 48-hour or longer week—the committee said "arbitrary extension" of the work-week for all employes "cannot possibly add any perceptible tonnage to the current rate of output."

In a letter to Mr. McNutt the committee said the effect of the order for the "indiscriminate imposition" of the 48-hour week in the steel industry creates so many practical operating problems that production may be impeded.

Because of the inflationary aspect of the order, the advisory committee sent copies of its letter to OPA Administrator Prentiss Brown, Stabilization Chief James Byrnes and WPB Chairman Donald Nelson. Walter S. Tower, president, American Iron and Steel Institute, signed the letter for the advisory committee, which was as follows:

"The steel industry welcomes any move which can aid in the current production of steel or the more effective utilization of manpower during this period of war. However, the indiscriminate imposition of the 48-hour week creates so many practical operating problems in the steel industry that the real effect may be to impede production. Such problems can be answered only with full knowledge of individual plant conditions and a disposition by all parties to recognize the limitations which those conditions create.

"On April 23, the advisory committee

UNCLE SAM TAKES OVER: Miners return to work for the government after the United States assumes control of the mines. "This is United States property" signs greeted the jubilant returning workers. NEA photo

of the Steel Division of the War Production Board addressed a letter to the director of that division in reply to a letter from the president of the United Steelworkers of America advocating the adoption of the 48-hour week. The letter stated in part:

" 'The committee feels that there is much misunderstanding and confusion with respect to the number of hours per week now being worked by employes in the steel industry. The members of the steel industry are not opposed to a 48-hour work-week when that number of hours is necessary. Many thousands of workers employed in the industry are now actually working 48 hours and from time to time even as much as 56 hours.

" 'Nowhere in the industry is there any disposition to arbitrarily hold down the length of the work-week when added hours are needed to assure maximum production. The principle upon which every steel company is now operating is that its employes are working whatever hours are necessary, consistent with health and facilities to produce what must be produced for this war emergency.

" 'Companies in the steel industry do not conceive their problem at this time to be to provide any specified number of hours or work per week for each employe. Each company is producing steel at the utmost of capacity. Any attempt to shift the emphasis of this major problem can serve no useful purpose in the war effort.

No Increase in Output

" 'The industry today is producing steel ingots at a shade over 99 per cent of capacity. Any arbitrary extension of the work-week for all employes would contribute nothing toward increasing steel production.'

"The committee restates this position today. The arbitrary order, to which the industry without regard to production or manpower needs, is now required to conform, can well retard rather than promote the effective prosecution of the war. The influences of this order already are contributing to increased wages.

"The industry will do whatever is possible in working with the manpower commission . . .

"The order apparently has been promulgated from lack of knowledge of actual operating conditions in steel mills.

"There is a war to win and the steel industry has done and will do its important part to that end."

The committee requested an early hearing on the order before the commission.

The McNutt order extending the steel work-week in effect gives wage earners their third wage increase in two years. In the spring of 1941, basic wages were advanced 10 cents an hour, adding $120,000,000 to $125,000,000 to the annual labor cost. In the summer of 1942, a further adjustment of 44 cents a day was ordered by the NWLB in establishing the "Little Steel" formula. This increased the industry's payrolls by about $75,000,000. The work-week extension just ordered brings the total labor cost increase in the two years to more than $300,000,000.

Mr. McNutt's latest order calling for an overall 48-hour week throughout the steel industry is characterized by steelmakers as spending $100,000,000 or more "to accomplish nothing". Overtime already is being paid where necessary for performance. Primary producing departments generally are working close to or more than 48 hours. Finishing or processing departments generally fall below this figure because of lack of ingot or semifinished steel.

Requires Expensive Adjustments

Arbitrary lengthening of the work week in most departments will cause expensive and uneconomical adjustments.

E. G. Grace, president, Bethlehem Steel Corp., speaking at the corporation's stockholders' meeting said: "I can see only one motive in trying to force the 48-hour week, and that is to get an increase in wages. The extra 8 hours at time-and-a-half will mean a pay rise of 8 to 9 per cent for the workers."

Overtime wage bills already are enormous, Mr. Grace pointed out. In the shipbuilding industry in 1942, such costs were $260,000,000. This, of course, was added to the price of the vessels, but the increase in costs to steelmakers could not be passed along in the same manner because of ceiling prices.

Mr. Grace remarked that: "Any increase in the cost of coal will put up the cost of producing steel." Steel prices, he said, have not advanced in "God knows how long," and he wondered just how it would be possible for the steel industry to continue to absorb

(*Please turn to Page 56*)

United States flag is raised over Pennsylvania coal mine after the President ordered the mines operated by the government. NEA photo

Woman swaging steel bars in Republic's Buffalo plant

Labor Shortage Eased by Women Taking Many Heavy Jobs in Mills

BUFFALO

FACED with a critical manpower shortage district steel mills have turned to womanpower for many of the "heavier" jobs and results have "proven far more satisfactory than anticipated."

Mill officials have nothing but praise for the manner in which 800 women, exclusive of clerical and office staffs, have stepped into man-size jobs. Mills report practically all of the women have had no previous experience in heavy industrial work. About 50 per cent of them never did any industrial work at all.

STEEL's representative visited Bethlehem Steel Co., Republic Steel Corp. plants and found groups of women working with the zest and stamina of men. Many have been on the job two to three months and without exception they all said: "I like my job."

Republic listed the following jobs formerly held by men in which women now are working:

Burners: These women are being used in the mills and various other locations in the plant for the gas cutting of steel scrap.

Chainman or hookers: In practically every operating department in the plant women are being used for such purposes. They place slings and chains around materials to be either loaded or unloaded from the railroad cars.

Crane operators: Women are being used in the bar mills.

Engineering learners: Women used on the less important jobs of tracing. Also used to operate blue print machine.

Helpers: Under this heading come a group of women in the chemical laboratory where with some instructions they will be able to carry on routine chemical analysis work.

Metallurgical helpers: Women help where samples of iron and steel are worked into a standard pattern through the use of lathes, presses, etc., and these women under direction qualify to do most of these tests.

Power house helpers: Women are used in the power department for assisting the men principally along electrical work. Electrical helpers are used for routine checking of wire work and minor installation work.

Machine shop helpers: Women work in the machine shop on such equipment as lathe, boring mill, drill press, planers, shapers and other standard machines. Helpers are employed in the pipe shop, principally on pipe assembly and similar types of work.

Welder helpers: Women work in the welding shop for standard welding. Helpers are used in the operation of mill shears and their duties consist of handling material to and from these mill shears.

Inspection: Women on visual inspection work which leads to the use of micrometers. Also, under inspection, visual inspection and marking of steel billets for scarfing and chipping.

Scarfers: A number of women are being trained to do the actual scarfing of steel, which is the process of eliminating breaks, seams, cracks, lap wells and defects from steel billets with a torch.

Four hundred women workers participated in construction of this tank landing ship, launched recently in the Navy's shipyard at Ambridge, Pa., operated by American Bridge Co., United States Steel Corp. subsidiary. A "Ladies' Day" celebration featured the ceremony. The sponsor—a woman—was selected in a drawing among her co-workers, many of whom appeared in welding togs

Skid men: Males are being supplemented in these jobs by women in the handling of billets from the billet yard to the heating furnaces in the finishing mills.

Roll shop apprentices: Women will be placed in these positions to learn the turning of rolls on lathes in the roll shop.

Labor: Women are being used in most operating departments in the plants as laborers. This ranges from blast furnaces laboring where they are being used on clean-up work, principally slag and refuse. In bar mills women are used for clean-up work and bundling and such labor work as might be found around a mill. A large group of women are at work in the mason department for tearing out burnt-out furnaces and assisting bricklayers in rebuilding. Women are employed as laborers in the shipping department for the loading of finished material, most of which is handled by cranes. In the open-hearth department and yard department they are being used principally for general labor work.

Republic has about 500 of the total women employed in the steel industry here. It has placed women in more individual jobs than Bethlehem. A Republic spokesman said that in the replacement of men by women "we have not lost any production. Naturally, these results have proven far more satisfactory than anticipated."

Both Bethlehem and Republic report the rate of turnover among women in heavy jobs is about 10 per cent. Both say this is a very low figure, all circumstances considered.

Edward F. Entwisle, general manager of Bethlehem's Lackawanna plant, explaining the situation, said: "While the job of making steel has traditionally been man's work, far-reaching strides have been made in the mechanization of this industry, as in other industries. There are a number of types of steel plant work which in the present emergency women should be able to perform satisfactorily."

Both companies are planning to expand their employment of women.

American Can Co.'s Torpedo Production Ahead of Schedule

Surface craft and aircraft torpedoes are rolling off the assembly line of the American Can Co.'s Illinois plant at six times the rate which the Navy contract set for next June, Carl G. Preis, vice president, announced last week.

The company's Missouri plant has a similar production rate. In addition to its own torpedo production the company is supplying other firms with torpedo parts, material and machinery lists, layout designs of tools, jigs and fixtures as well as special machinery and equipment to assist them in getting torpedo production under way, Mr. Preis said.

Contracts for 37 Liberty Ships Awarded Maine Yard

The Maritime Commission has announced the awarding of contracts for construction of 37 Liberty ships to the New England Shipbuilding Corp., South Portland, Me. Production schedules call for delivery of 18 of the vessels by the end of this year and the remaining 19 in 1944.

New England Shipbuilding Corp. was formerly operated under the name of the South Portland Shipbuilding Corp. Change of management was recently effected to speed up production at the yard.

These women have replaced men in the tank armor ordnance plant, Carnegie-Illinois Steel Corp., Farrell, Pa. They are making a final check on one of the big plates

Munitions Output Up 11 Per Cent in March

Munitions production in March advanced 11 per cent over the February index, according to WPB Chairman Donald M. Nelson. On a daily average basis, however, there was little change as March had three more days than February.

Several new production records were established during the month. Among these were:

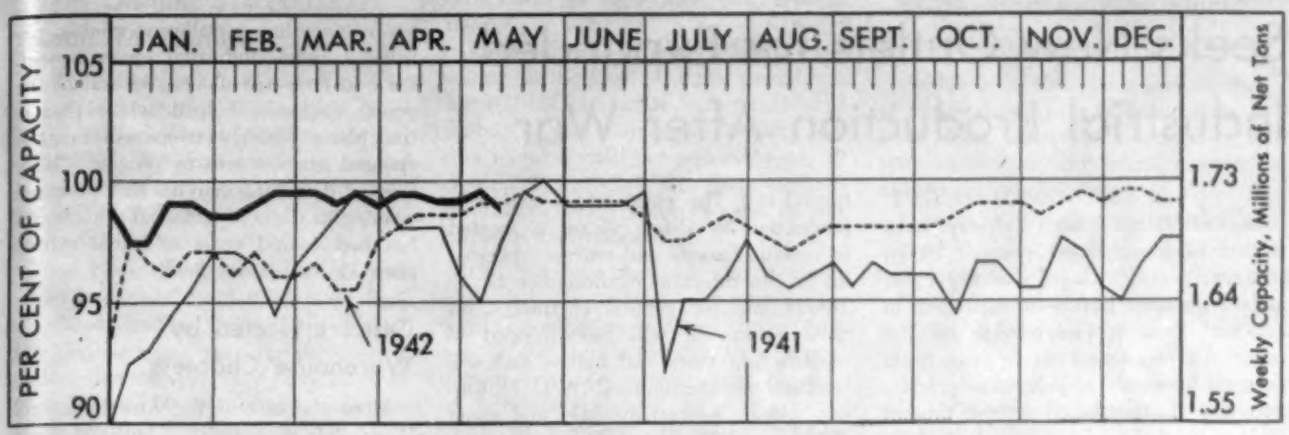
Aircraft output reached a new high of 6200 planes.

Construction of both naval and merchant ships, measured by volume of work done in the shipyards, was the greatest on record.

Delivery of Liberty ships exceeded 100.

(During April, 157 merchant vessels were launched, according to the Maritime Commission. This established a new record and brought the total of merchant ships launched during the first four months to 536).

However, first quarter munitions production was only 18 per cent of the total scheduled for the year, indicating average quarterly production for succeeding quarters must be 27 per cent of the program, or 50 per cent greater than in the first quarter of this year.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670	....	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	....	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,238	5,083	5,201
1941	4,066	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Gains were shown in all five categories for March, as follows:

Aircraft ..... Up 11 per cent
Ground ordnance ..... Up 7 per cent
Navy and Army vessels—Up 14 per cent
Merchant vessels ..... Up 7 per cent
Miscellaneous munitions Up 12 per cent

Although there are indications that war production in the next month or two will show substantial gains, the great advances made in the last year cannot be sustained for many months longer.

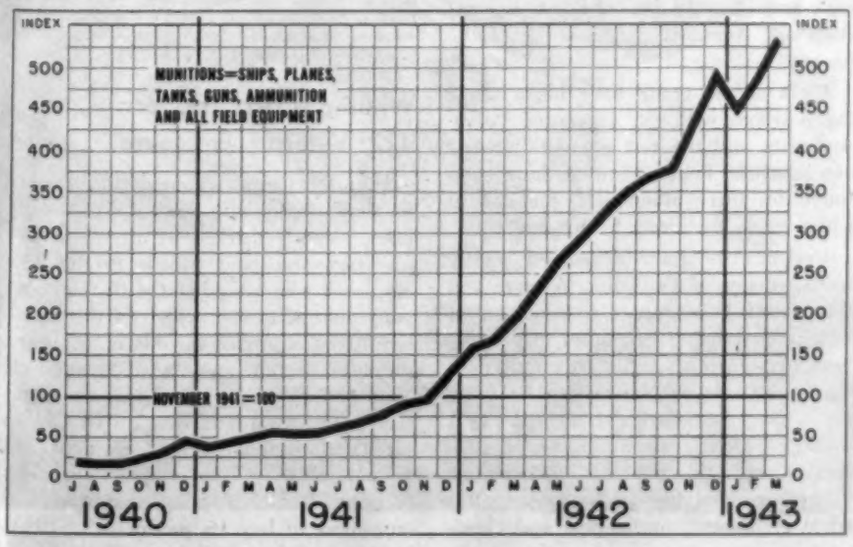
"One of the facts we must face," says WPB, "is that the amount of steel available for war production, although enormous, has its limits. We are nearing top capacity of steel production. Our allocation system has cut down steel going into civilian production to a minimum. This means that war production is getting nearly as much steel as it can get." Accompanying chart illustrates the gain in munitions production since the war effort started.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended May 8	Change	Same week 1942	Same week 1941
Pittsburgh	100	—1	95.5	94
Chicago	99	None	105.5	101.5
Eastern Pa.	94	None	95	95
Youngstown	95	None	94	95
Wheeling	92.5	—0.5	82.5	88
Cleveland	88	—7	88.5	96.5
Buffalo	90.5	—2.5	93	90.5
Birmingham	100	None	95	90
New England	90	—5	93	90
Cincinnati	94	+3	89	89
St. Louis	87	—6	93.5	98
Detroit	96	None	90	88
Average	98.5	—1	*99	*97.5

*Computed on bases of steelmaking capacity as of those dates.



Ingot Rate 98½ Per Cent, Down 1 Point

Production of open-hearth, bessemer and electric furnace ingots last week declined 1 point to 98½ per cent, lowest since the first week of February. One district advanced, six declined and five were unchanged. A year ago the rate was 99 per cent; two years ago it was 97½ per cent, both based on capacity as of those dates.

Colonial blast furnace of Riddlesburg Coal & Iron Co., at Riddlesburg, Pa., is scheduled to be blown out May 15. Production by this stack was continued at request of WPB beyond the first date set for shutting down, April 15. Bethlehem Steel Co. has delayed blowing in its new stack at Lackawanna, N. Y., until ore supply is better.

April Plate Output Holds at High Level

Steel plate production in April totaled 1,121,000 tons, highest on record for any 30-day month, according to the WPB Steel Division. This compared with 1,167,679 tons in March.

April production figures were gratifying to WPB authorities who had feared the Truman committee investigation, which disclosed irregularities in testing procedures by Carnegie-Illinois Steel Corp., would adversely affect deliveries by making producers more than ordinarily over-cautious.

Seeks New Outlets for Expanded Industrial Production After War

TORONTO, ONT.

GOVERNMENT and industry have started to consider the postwar reconstruction period. Under war stress Canadian industry has been expanded to a point where it can provide for the needs of a population two or three times as great as now. If peacetime production is to be continued on the present scale new outlets for products will be necessary.

In recent prewar years manufacturing industries employed about 650,000 persons and produced goods annually to the value of about $3,500,000,000. At present about 1,250,000 persons employed in industry produce goods valued at $8,000,000,000. A recent survey showed about 4000 plants are on direct or indirect war work. Before the war exports were valued at about $1,000,000,000 annually, about 70 per cent of which was partially or fully manufactured. Last year exports totaled about $2,500,000,000. To find ways and means for disposing of greatly increased production of manufactured goods special study is being undertaken.

Mines to Resume Production

Dominion Steel & Coal Corp. Ltd., Sydney, N. S., is making arrangements to resume partial operations at its iron ore mines at Wabana, Newfoundland, which were closed early this year because stock piles exceeded 500,000 tons and there was shortage of ships for transporting ore. It is stated that three mines will resume production on a four-day schedule to provide ore for the company's Sydney mills. Department of Munitions and Supply announces it will provide shipping to move the ore.

Canadian plants in certain lines of munitions production have furnished their full requirements and men may be transferred from these to other industries, primarily to shipyards, C. D. Howe, minister of munitions and supply, announced. Escort vessels are greatly needed. Canada has about 500 of these in service and will build about 140 this year, including corvettes, minesweepers and frigates. The latter cannot be built on the Great Lakes because they are too long to pass through canal locks. Tide water yards will concentrate on that type.

Dominion Rubber Co. Ltd., Montreal, Que., has been given a contract by the Department of Munitions and Supply to operate a small arms ammunition plant under the name Dominion Rubber Munitions Ltd. The plant which will start production in a few weeks is located in eastern Canada and will be operated under the direction of Brigadier D. E. Dewar, director general of small arms ammunition. It will be equipped to manufacture cases and bullets and will load and test ammunition. A. C. McKinnon will be general manager and about 1000 men and women will be employed.

Production of iron and steel and their manufactures in Canada in 1941 at factory prices were valued at $1,483,169,765, which was 60 per cent greater than the final 1940 figure of $906,103,055, according to the Dominion Bureau of Statistics. In 1941 operating plants in the group numbered 1760, against 1433 in the preceding year. Average number of employes in the industry was 253,701 in 1941 and 164,325 in 1940.

Canadian steelworks and blast furnaces in March increased production over February, and output of steel ingots and castings exceeded that of March, 1942, while pig iron and ferroalloy production fell short of a year ago. Over the first three months output in all three divisions was less than in the corresponding quarter in 1942. Figures and comparisons are as follows:

	Steel ingots, castings	Pig iron	Ferro-alloys
March, 1943	270,962	160,101	18,611
Feb., 1943	245,588	138,240	16,356
March, 1942	265,903	167,116	20,261
3 mos., 1943	723,558	414,668	50,298
3 mos., 1942	767,840	474,245	55,623

Chinese Engineers Studying U. S. Industrial Techniques

Thirty-two young Chinese engineers have arrived in the United States and are studying American engineering techniques.

Eight of the group have taken training positions with the Tennessee Valley Authority and the rest are with American industrial firms. Positions have been found for three others who are still in China or on their way to this country.

Under a program developed jointly by the Board of Economic Warfare and the National Resources Commission of China, the young engineers will work here two years in fields which in most cases they selected as their major interest. The men assigned to the TVA indicated an interest in phases of electric power generation and distribution. Others are studying production of electrical equipment, mechanical and chemical engineering, metallurgy, mining, petroleum and industrial management. Prior to their arrival here several of the young engineers helped rebuild industrial plants which were moved from the ravaged seacoast area to Western China. Each of the young men has had advanced training in Chinese technical schools and has had several years of actual experience in his chosen field.

Officers Elected by Warehouse Chapters

More chapters of the American Steel Warehouse Association, Cleveland, have elected officers, as follows:

Central States: President A. J. Kueber, Steel Warehousing Corp., Chicago; vice presidents, W. J. Holliday, W. J. Holliday & Co., Indianapolis, Ind.; W. H. Tudor, Indianapolis Machinery & Supply Co., Indianapolis; secretary, T. B. Daniels, Jones & Laughlin Steel Corp., Chicago; treasurer, L. B. Kidwell, General Steel Warehouse Co. Inc., Chicago; national director, A. J. Kueber, Steel Warehousing Corp., Chicago.

Missouri Valley: President, Fred L. Evans, Steel Mfg. & Warehouse Co., Kansas City, Mo.; vice president, W. P. Patterson, Patterson Steel Co., Wichita, Kans.; secretary-treasurer, Herman H. Kuehlke, Richards & Conover Hardware Co., Kansas City; national director, Henry B. Neef, Gate City Iron Works, Omaha.

New York: President, Charles Kramer, United States Steel Supply Co., Newark; vice presidents, William G. Carter, Faitoute Iron & Steel Co., Newark; James P. Donnelly, Atlas Supply Co. Inc., Brooklyn; secretary-treasurer, William C. Hughes, Bright Steel Corp., New York; national director, Paul C. Grammer, Grammer, Dempsey & Hudson Inc., Newark.

Northwest: President, L. H. Williams, Williams Hardware Co., Minneapolis; secretary, Winter Dean, Nicols, Dean & Gregg, St. Paul; national director, L. H. Williams.

Philadelphia: President, Leslie Edgcomb, Steel Co., Philadelphia; secretary-treasurer, J. M. Mead, Joseph T. Ryerson & Son Inc., Philadelphia; national director, Guy P. Bible, Horace T. Potts Co., Philadelphia.

St. Louis: President, A. L. Petersen, Joseph T. Ryerson & Son Inc., St. Louis; vice president, Bruce Haines, E. E. Souther Iron Co., St. Louis; secretary, L. F. Niemann, United States Steel Supply Co., St. Louis; treasurer, E. W. Fleer, Schurk Iron Works Inc., St. Louis; National director, L. H. Jostes, Beck & Corbitt Co., St. Louis.

Wisconsin: George W. Smith, Joseph T. Ryerson & Son Inc., Milwaukee, Wis.; vice president, John C. Pritzlaff, John Pritzlaff Hardware Co., Milwaukee; secretary-treasurer, Fred O'Dell, Edgar T. Ward's Sons Co., Milwaukee; national director, George Gibbs, Gibbs Steel Co., Milwaukee.

Whiting Corp. Honors 422 Veteran Employes

Whiting Corp., Harvey, Ill., manufacturer of foundry and railroad supplies, recently marked its fifty-ninth anniversary and paid tribute to the 422 employes who have been with the company more than five years. Of this number 70 have service records of 25 years or more. Service pins and portraits of John Hill Whiting, founder of the company, were awarded. Howard D. Grant, president, addressing the employes, attributed much of the company's success to policies of fair dealing that attracted customers to buy its products.

Lukens Obtains $10,000,000 V-Loan To Finance Expansion

Lukens Steel Co., Coatesville, Pa., with its subsidiaries, By-Products Steel Corp., and Lukenweld Inc., has arranged a $10,000,000 V-loan credit to finance their increased war production program, Robert W. Wolcott, Lukens' president, announced last week.

The interest rate is 3 per cent per year on the amount of the $10,000,000 which is utilized, and a commitment fee of 0.25 per cent per year on the unused portion. Currently, the company plans to utilize only $5,500,000 of the credit.

The agreement was negotiated with the Bank of the Manhattan Co., New York, which acted as agent for others participating.

The $10,000,000 credit was arranged in co-operation with the United States Navy Department and the Federal Reserve Bank of New York, Mr. Wolcott said.

The companies' consolidated sales volume in the fiscal year just passed was $46,490,462.91, before renegotiation of contracts, which represents a 50.5 per cent increase over the previous year, all of which is war work, directly or indirectly. Further sharp gains in sales of war materials are reported.

The V-loan agreement also provides protection for Lukens and subsidiaries with respect to payment of the proportion of the loan applicable to war production contracts which might possibly be hereafter canceled by the government. If war contracts are canceled to the extent of 25 per cent or more of their total value, the agreement provides that the company will not be required to pay this portion of the loan until settlement of the canceled contracts has been reached.

DPC Authorizes War Plant Expansions, More Equipment

Additions to war plants and purchases of new equipment to be financed by Defense Plant Corp. and operated by the contractors were authorized recently as follows (figures approximate):

Commodity Credit Corp., Washington, to provide plant facilities in Iowa at a cost of $350,000.

Standard Steel Corp., Los Angeles, to provide equipment for a plant in California.

S. K. Wellman Co., Cleveland, to provide equipment for a plant in Ohio at a cost of $260,000.

Bell Aircraft Corp., Buffalo, to provide additional plant facilities in New York at a cost of $4,500,000, resulting in an overall commitment of $22,000,000.

Sylvania Electric Products Inc., Emporium, Pa., to provide additional facili-

TIMBER CONNECTORS "SAVE 400,000 TONS OF STEEL" IN YEAR

STEEL-RINGED timber connectors, which are used to increase the strength of joints in wood construction, saved more than 400,000 tons of steel for war production in 1942, according to WPB Conservation Division.

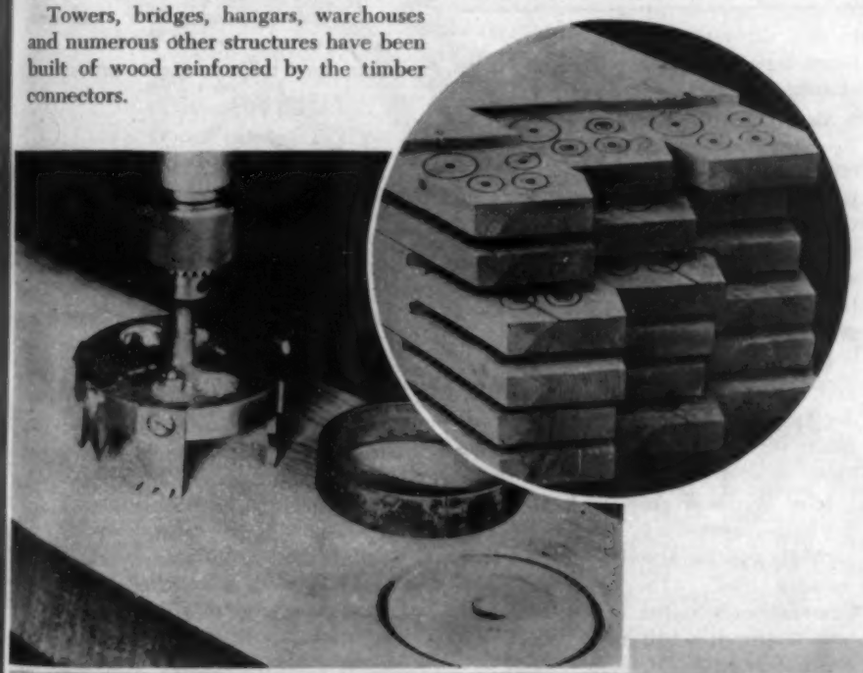
Towers, bridges, hangars, warehouses and numerous other structures have been built of wood reinforced by the timber connectors.

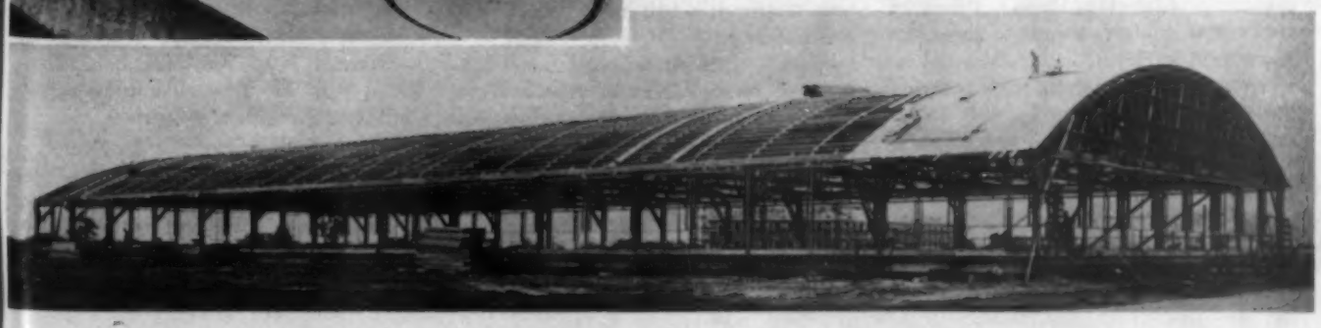
The connectors are pressed steel rings or malleable iron plates ranging from 2½ to 6 inches in diameter. Placed in circular grooves between adjacent faces of overlapping timbers, the rings provide a larger supporting area than that obtained by other methods of joining timber. In contrast, a relatively small supporting area is supplied by bolts, customarily used for this purpose in joints.

Highest wood tower that could be built before the development of this technique was limited to 80 feet by the weakness of supporting joints. Using the timber connectors, wood towers as high as 300 feet may be built.

Photo in circle shows prefabricated timber prepared for timber connectors. At right, is shown the timber in process of preparation. Below, a 166-foot wide clear span mold loft building constructed of wood reinforced with timber connectors. This building has been duplicated in many shipyards.

Patents rights to the timber connector, a Swedish invention, were acquired by Dr. Wilson Compton, secretary-manager of the National Lumber Manufacturers' Association, Washington. The association organized the Timber Engineering Co. to make the connectors. This company now is the association's research agency and its profits go into research in the uses of wood.





ties at a plant in Pennsylvania, at a cost of $275,000, resulting in an overall commitment of $525,000.

Erie Resistor Corp., Erie, Pa., to provide additional plant facilities in Pennsylvania, at a cost of $100,000, resulting in an overall commitment of $400,000.

Haile Gold Mines Inc., Kershaw, S. C., to provide additional plant facilities in Alabama at a cost of $30,000, resulting in an overall commitment of $200.000.

Pittsburgh Metallurgical Co. Inc., Niagara Falls, N. Y., to provide additional facilities at a plant in South Carolina at a cost of $70,000, resulting in an overall commitment of $900,000.

Raytheon Production Corp., Newton, Mass., to provide plant facilities in Massachusetts at a cost of $90,000.

National Pneumatic Co., Rahway, N. J., to provide equipment for a plant in New Jersey at a cost of $350,000.

Brewster Aeronautical Corp., New York, to provide for the purchase of machinery and equipment for a plant in New York at a cost of approximately $625,000.

Breeze Corps. Inc., Newark, N. J., to provide plant facilities in New Jersey at a cost of $250,000.

Commodity Credit Corp., Washington, to provide plants in Illinois, Indiana, and Minnesota at a cost of $350,000 each.

General Motors Corp., Detroit, to provide additional equipment for a plant in Indiana at a cost of $760,000, resulting in an overall commitment of $2,650,000.

Standard Oil Co. of Louisiana, New York, to provide equipment for a plant in Louisiana at a cost of $440,000, resulting in overall commitment of $9,500,000.

Talon Inc., Meadville, Pa., to provide additional equipment for a plant in Pennsylvania at a cost of $190,000.

Murray Corp., Detroit, to provide plant facilities in Pennsylvania at a cost of $4,000,000.

E. I. duPont de Nemours & Co., Wilmington, Del., to provide plant facilities in New York and Virginia at a cost of $4,400,000.

Dolomite Products Co. Inc., Rochester, N. Y., to provide plant facilities in New York at a cost of $185,000.

Firestone Tire & Rubber Co., Akron, to provide plant facilities in Georgia at a cost of $600,000.

Rheem Mfg. Co., South Gate, Calif., to provide additional equipment for a plant in California at a cost of $90,000, an overall commitment of $290,000.

Rohm & Haas Co., Philadelphia, to provide facilities for plant in Pennsylvania at a cost of $200,000, resulting in overall commitment of $600,000.

Longer Work-Week Circumvents Formula

(*Concluded from Page 50*)

increased costs and remain solvent.

He pointed out that when an extra day was added to the miners' schedule, the weekly wage increase amounted to 30 per cent, adding, "but that is a matter between the government and the coal industry."

Speaking in a similar vein, Irving S. Olds, chairman, United States Steel Corp., said:

"If there are to be material increases in employment costs or in taxes in the future, these increased charges can only be met by absorbing in part or in whole the returns to stockholders and the balance for future needs, or by increasing the price of steel products. Prices of major steel products today are about the same as in 1939, although substantial increases in operating costs have occurred since that year.

"The earnings over the years of any basic industry, such as steel, should be sufficient after taxes and other costs to pay a reasonable amount to the owners of the business, to attract additional capital when required, and to permit retaining enough money to provide for technological progress and to take care of future demands."

Mr. McNutt in ordering the 48-hour week for steel estimated that about 50,000 workers would be added to the labor force. He said the longer work-week should reduce the turnover in steel labor supply because of the increase in wages to steelworkers. Order affects blast furnaces, steelworks and rolling mills.

Until the adoption of the order, he said, the steel industry has operated under handicaps with respect to other war plants which have offered greater opportunity in overtime pay.

Most of the workers to be freed by the longer work-week, according to Mr. McNutt, can be absorbed by the steel industry itself. The War Manpower Commission, he stated, has enough orders now to absorb a half-million workers in war industries.

Six-day week in the coal mines was ordered by Solid Fuels Administrator Harold L. Ickes soon after he was appointed by the President to take charge of the mines in the government's name. Private operators were ordered to continue managing the mines for the government.

Most mines have been operating on a 6-day week basis since last February, and ordinarily only small mines are affected by Mr. Ickes' edict.

Pending settlement of the dispute between the United Mine Workers and the government over the UMW's demand for higher wage rates, portal-to-portal pay and unionization of foremen, Mr. Ickes urged all coal consumers to conserve all coal possible.

Mr. Ickes said that consumers had about 77,000,000 tons on hand.

"This would be enough bituminous coal to last only a little more than six weeks, if it were evenly distributed," Mr. Ickes said. "However," he continued, "it is not evenly distributed among the various users."

The steel mills and railroads, he stated, are in a particularly precarious position. Figures show that the steel plants in Ohio had an average of only 23 days' supply on hand, and the amount of coal held by the steel mills averaged only 33 days' supply on a national basis. Some individual plants have far less than the average supply on hand.

Railroads held an average of only 32 days' supply, on a national basis, while the southwestern roads had an average of but 25 days' supply on hand.

"A lack of coal to keep our war industries operative would have dire results so far as the war is concerned," Mr. Ickes said. "We can't make and transport guns, tanks, planes, and ammunition, or even provide food and supplies for our military forces unless we have adequate coal."

Steel Employment Higher in March; Payrolls at New Top

Employment in the steel industry increased in March, an average of 637,000 workers comparing with 635,000 in February, according to the American Iron and Steel Institute. Average number employed during the first quarter was 635,000, almost 16,000 less than in first quarter last year.

Steel payrolls in March aggregated $136,813,000, topping all prior records. Increase over February was approximately 11 per cent.

During the month wage-earning employes worked an average of 42.2 hours per week against 41.6 hours in February and 38.1 hours in like month a year ago. Steelworkers received an average of 110.3 cents per hour, compared with 110.5 cents in prior month and 100.1 cents in March, 1942.

United Aircraft Corp., Hartford, Conn., recently announced a special training program in selected universities to prepare women as engineering aides through establishment of Pratt & Whitney Aircraft Fellowships.

High Grade Carbon Steel To Be Regulated by War Board

BECAUSE of the increased demand for high quality carbon steel to meet war requirements, special measures are being taken by the WPB Steel Division to regulate production of this grade of steel, H. G. Batcheller, director, announced last week.

In the production of quality carbon steel certain extra facilities and equipment are needed. Some of these facilities are now employed in the production of alloy steel, and therefore it has become necessary to establish closer scheduling controls on production.

Every effort is being made by the Steel Division, Mr. Batcheller said, to urge buyers to use regular carbon steel in place of the quality grades wherever it is practicable to do so.

These questions have been discussed with the industry advisory committee and each producer has been informed by Mr. Batcheller that in the future production directives will be segregated between regular carbon steel, quality carbon steel, and alloy steel.

The Production Directive Committee of the Steel Division is exploring this problem with each individual producer and adjusting the production directives to meet the demands for the different grades of steel. These moves are expected to make possible the use of available quality carbon steel facilities to the best advantage of the war program.

Quality carbon steel has been defined by the Steel Division as steel which is made in hot-topped molds, or if made in open-topped molds, is subject to special discard or receives special surface preparation at an intermediate form or in final form.

SWPC and WPB Separated; Each To Maintain Field Offices

Terms of the separation of the Smaller War Plants Division from the WPB, and an outline of the functions to be performed in the field by the WPB and the SWPC were announced last week by WPB.

Responsibilities of WPB and SWPC in the field offices will be divided on the broad principle that the WPB will center its activities on production and servicing in all its phases, whereas the SWPC will concentrate its activities on location of distressed plants and procurement of business for smaller plants and business concerns, and the corollary services which normally go with those functions.

Each agency will maintain a field organization of its own, but in view of the fact that many of the activities are inter-related, the offices wherever possible are to be located in the same building. However, each is to maintain clearly its separate functional identity, both physically and administratively.

Also announced were the terms of a memorandum issued jointly by Donald M. Nelson, WPB chairman, and Col. Robert W. Johnson, chairman, SWPC, to regional directors of the WPB and the SWPC defining the respective duties of these directors.

Regional director for the SWPC is responsible for locating companies which require assistance and for obtaining that assistance in terms of contracts and financial help.

Idle Aluminum To Be Directed Into Scrap Channels

WPB has announced it will terminate June 30 previously established schedule of prices paid for idle aluminum and direct such material into normal scrap channels. The new plan will apply to nonusable aluminum reported after that date by holders of idle inventories.

Wherever possible, all materials in primary forms reported on WPB-667 will continue to be moved into war uses in their present forms through direct transactions between holders and buyers. In such transactions the seller, of course, receives the full price as established under OPA regulations.

Owners of aluminum which became idle as a result of WPB conservation orders and which has not yet been reported to the War Production Board will come under the existing higher-than-scrap price schedule if they report their inventories to the WPB Redistribution Division before June 30.

Tool Steel Scrap Removed From GMPR Control

Maximum price regulation for tool steel scrap which will facilitate recovery of alloy steel scrap containing tungsten, molybdenum and cobalt that is critically needed for use in munitions, armaments, and the tools to make them, has been issued by OPA.

The regulation removes tool steel scrap from price control under the General Maximum Price Regulation, and establishes specific dollars-and-cents ceiling prices that consumers may pay for five types of segregated scrap, as well as for unsegregated material. In general, maximum prices set by the regulation conform to existing ceiling prices, but segregation requirements are more sharply defined to assure the delivery of the scrap in a condition that is readily usable in the production of present types of high-speed tool steels and other special alloy steels.

Provision is made in the regulation for dealer and quantity differentials, and for a premium on cobalt content of 3 per cent or more. However, if the cobalt content is more than 0.50 per cent or less than 3 per cent, a penalty is applicable. Penalties are also prescribed for nickel and copper contaminations in excess of 0.25 per cent each.

Light Power-Driven Tool Sales Banned on PRP Ratings

War Production Board has modified provisions of order L-237, controlling production and distribution of light power driven tools, including electric, belt, pneumatic and hydraulic driven types but excluding purely woodworking tools. The order now prohibits purchase or delivery of light power-driven tools on ratings assigned by a PRP certificate or applied pursuant to CMP Regulation No. 5 or 1A. This ban does not apply to deliveries of items which had a producer's list price on Oct. 15, 1942, of $175, or less, an increase from the original limit of $35. It also does not apply to deliveries by producers on purchase orders received prior to May 3 which have been rated pursuant to CMP Regulation No. 5 or 1A.

Advisory Committee Discusses Steel Problems

WPB's steel industry advisory committee last week at its regular monthly meeting discussed alloy steels, iron ore and other industry problems.

Report of the Bent committee dealing with the British steel situation was read to the steel executives.

A. D. Whiteside, civilian supply chief, and Army representatives presented civilian and Army steel requirements.

James Douglas, consulting engineer of Los Angeles, has been appointed director of WPB's Zinc Division, succeeding George C. Heikes who resigned April 28. Mr. Douglas joined the staff of the Copper-Zinc Branch in May, 1941, and a year later joined the Mining Equipment Division, which he leaves for the new post.

WINDOWS of WASHINGTON

Navy Modifies Demands

When the Navy recently reduced the tensile strength requirement of medium welding steel plate to 58,000 pounds per square inch, it was not giving away as much as was believed by some in the trade. Although it thus reduced the tensile strength, at the same time it refused to reduce required yield strength below the 33,000 figure—and yield strength usually is figured as approximately 50 per cent of tensile strength.

Furthermore, where the Navy previously had accepted tensile of 57,000 pounds it did so when only one test ran 57,000 pounds and the average was 60,000 pounds or better. The Navy now is not accepting anything under 58,000 pounds.

The modification applies only to plate rolled on strip mills. It does not apply to plate rolled on plate mills—where specifications continue unchanged.

Air Conditioning Up Again

It is expected that the subject of blast furnace air conditioning, about which so much was said early last year, again will get considerable publicity in the near future. Reports here are to the effect that pig iron production was stepped up last winter at several northern blast furnaces as a result of maintaining uniformity in the amount of moisture in the air passing into the stacks. It is expected there will be more of this in coming months.

Information Swap

On more than one occasion Maj. Gen. Levin M. Campbell Jr., Chief of Ordnance, has complimented war contractors in general on the effective way in which they exchange information on better ways of manufacturing.

This exchange of information is through industry committees of which there now are 102. Just for purposes of illustration a few of them may be named—the Field Howitzer, Heavy AA Gun, Optical Instrument, Remote Control System, 37-mm Tank and Anti-Tank Gun, Anti-Tank Mine, BD M66A1 Fuze, M62-BD Fuze, M115 Adapter Booster Committees.

Each committee is headed by one of four brigadier generals at Washington. Their responsibility is to make sure each committee functions. Aside from this angle all functioning is in the field.

Each committee has an assistant chairman, selected from the industry, and each is assigned an ordnance officer. Should a carbine manufacturer, for example, be short of steel or be threatened with any other trouble, he gets in touch with the industry's ordnance officer. If an aircraft engine manufacturer is threatened with a shortage of parts made in a St. Louis plant, the engine manufacturer tells his story to the industry committee's ordnance officer and the ordnance officer calls up the Ordnance District Office in St. Louis and the latter office takes action.

A good illustration as to how the committees work is reflected in the work of the Fragmentation Bomb Parachute Committee. Those manufacturers who received the first contracts prepared a book of thoroughly captioned photographs that explain every step in the manufacture of the chutes. As a result, other manufacturers have been able to get into production without experiencing the pioneer's headaches.

Another example of good results is the work of the Steel Cartridge Case Committee. As everyone involved knows, the evolution of a successful technique in the manufacture of steel cartridge cases has been a painful process. By close co-operation five contractors worked the problem out. Today 79 manufacturers have contracts for making steel cartridge cases.

MORE FOR RUSSIA

In 1942 approximately 6,000,000 net tons of steel were shipped from the United States under lend-lease. This included steel in all forms, both finished and semifinished. This compares with prewar exports ranging from around 800,000 tons to 2,000,000 tons annually, depending on demand trends. This year shipments to foreign destinations are at a somewhat lower rate than in 1942 but continue heavy. It is learned, incidentally, that the amount of steel awaiting shipment to Russian ports is large, whereas that destined for shipment to Great Britain is comparatively small.

Cartridge Case Problem

Visiting steel men from different parts of the country are less enthusiastic about the steel cartridge case program than might be expected on the basis of optimistic reports that have been circulated in Washington's informed quarters. The steel men report an extremely high rate of rejection of metal produced to meet this requirement. These rejections involve principally slabs which have nonmetallic inclusions that would cause damage to dies if rolled into strip and formed into cartridge cases. The producers admit that this sounds like a simple problem of getting rid of "bugs" in the melting department. Actually, they say, it is a most difficult one.

Aviation "Dogfight" Looms

Big and bitter dogfights loom in the aviation industry after the war. Airline operators will want to take over the Army's transport planes on the basis of 10 cents per $100 or thereabouts so that they can compete against the railroads and other forms of transportation. These companies have ambitious plans for after the war, as indicated by the recent applications for permission to operate air routes from Chicago to Singapore and from Boston to Moscow.

Opposed to operators are the plane manufacturers who point out that such a policy would prevent them from selling commercial cargo planes in volume after the war, and would bring ruin to the industry. They want to have these cargo planes scrapped; at least they want them kept off the market.

From an international point of view the airlines have this argument in their favor. They hold that once the emergency is over there will be a race between various countries for domination of the world's air routes. They argue the country that gets into the air first will have a great advantage. Hence, they say, golden opportunities would be lost if they have to wait for new planes to be built in the large numbers they think will be required.

Government officials actively in touch with aviation in all its phases are keenly concerned with this problem and its solution. It is a case of unemployment in domestic plants vs. supremacy in the world's air transportation. Aside from the recent exchange between Congressman Clare Luce and Mrs. Roosevelt, the issue has not yet come up for debate in Congress. When it does, some fireworks can be expected.

Negroes Gain Adherents

Employers throughout the country should realize the cause of the Negro has gained many new adherents in Congress, particularly representatives from Northern states. For example, Senator Mead, New York, recently delivered a lengthy address in the Senate on the effectiveness of 13,000,000 American Negroes in the war effort. He cited instance after instance where Negroes have been doing fine work in industry or where they have served heroically in our armed forces. In the past it often has been said that the Negroes are the last to be hired and the first to be laid off. Whether discrimination will appear in the postwar period remains to be seen.

POINTERS

ON KEEPING YOUR CINCINNATI PLAIN GRINDER RUNNING . . .

LONGER . . . MORE EFFICIENTLY

A SIMPLE, easy-to-follow routine and common-sense precautions will do much to keep your machine tools running longer . . . more efficiently. Here are a few pointers for CINCINNATI 10" Plain Hydraulic Grinding Machines:

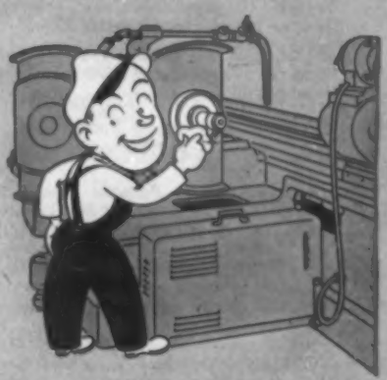
1. Lubricate your machine daily, using oil of the recommended specifications. Change oil as recommended; oftener if shop is dusty or if machine is operating three shifts. Lubrication schedule tag tied to machine will help.
2. Change replaceable filters and clean spindle oil filter when changing oil. New filters are cheap insurance against machine breakdown.
3. Accurate work tolerances require periodic releveling of the machine. Foundations are rarely stable enough to maintain the accuracy of initial leveling.
4. High grade finishes require clean coolant. Remove sludge from coolant reservoir once or twice a week.
5. When changing wheels, remove collet and clean out drain hole. This simple precaution will keep coolant out of spindle oil.
6. Use handwheel retraction of footstock center for heavy work and when removing stock rapidly. Don't take a chance on work jumping out of machine.

CINCINNATI

CINCINNATI 10" Plain Hydraulic Grinding Machine. Advantages and engineering specifications fully covered in catalog G-490. Copies available at no obligation whatever.

Follow printed instructions in lubricating your machine. An oil schedule tied to the machine will help, and a central lubrication department will do a better job.

Check level of machine periodically, and relevel if necessary. How often depends upon type of foundation. Check after first month of operation.



Remove collet at least once a month and clean drain hole and slinger grooves.

Item No. 1—the most important factor of longevity and high efficiency in machine tools—is fully covered by our lubrication booklet, No. M-1084-2. Copies available on request.

CINCINNATI GRINDERS INCORPORATED CINCINNATI, OHIO, U.S.A.

CENTERTYPE GRINDING MACHINES . . . CENTERLESS GRINDING MACHINES . . . CENTERLESS LAPPING MACHINES

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide, published in Section II of STEEL, this issue.

CMP REGULATIONS

No. 2 (Inventory Direction No. 7), issued May 3. Permits an operator of transportation systems to maintain materials for emergency repairs to the extent authorized by the WPB Transportation Equipment Division under preference rating order P-142.

No. 3 (Direction No. 2), issued April 22. Requires manufacturers of combat measuring instruments, as defined in order L-203, to schedule production of such items on basis of preference ratings alone, without reference to allotment numbers. Under terms of CMP regulation No. 3, a rated order accompanied by an allotment number takes precedence over orders bearing the same rating but without an allotment number. However, the "up-rating" effect of allotment numbers will not apply in the case of combat measuring instruments.

E ORDERS

E-5-a (Directive No. 1): **Gages and Precision Measuring Hand Tools,** issued April 23. Authorizes manufacturers to make shipment during May and June against any order issued prior to March 26, not exceeding $200 net billing value and bearing rating of A-9 or higher. All other orders must bear certification as required under order E-5-a.

E-6 (Amendment): **Hand Service Tools,** issued April 28. Provides that WPB modify production and delivery schedules.

L ORDERS

L-33 (Amendment): **Portable Electric Lamps and Shades,** effective April 30. Permits manufacturers to produce until July 15 lamps and shades from parts which had been wholly or partially fabricated by Dec. 10, 1942. Prohibits production after July 15 except for orders of Army, Navy, Maritime Commission and War Shipping Administration. Restrictions of copper conservation order M-9-c do not apply to specified parts that were in a manufacturer's or his supplier's inventory on Dec. 10, 1942. Wire and wire frames which were held in inventory on that date may be used until July 15.

L-64 (Amendment): **Caskets, Shipping Cases and Burial Vaults,** effective May 1. Revises restrictions on sizes and types which may be manufactured. Permits manufacturers to assemble caskets until June 30 with parts fabricated prior to May 1. Use of iron and steel for reinforcing concrete burial vaults may be continued through June on the same limited basis as provided previously in the order.

L-103 (Amendment): **Civilian Defense Helmets,** effective April 27. Prohibits manufacture and sale except to fill orders of governmental agencies.

L-206 (Amendment): **X-ray Equipment,** effective April 28. Prohibits manufacture during May except to fill orders by the Army, Navy and for Lend-Lease purposes, and for industrial radiographic and fluorscopic equipment specifically authorized by WPB. Manufacturers must submit on PD-774 proposed monthly production and shipping schedules for approval or change by WPB. Beginning June 1 production and shipping must conform to schedules approved or modified by WPB and these schedules take precedence over preference ratings assigned by purchase orders or any other WPB regulations. Simplifies procedure of extending WPB authorization of purchase orders on form PD-556.

L-270: Automotive Maintenance Equipment, effective April 29. Places use of copper under restrictions identical with those applying to the use of steel, aluminum and other critical materials. No critical material can be used where use of less critical material is practicable. Places restrictions on use of critical material in production of such equipment for the armed forces, Maritime Commission, and War Shipping Board.

L-287: Portable Conveyors, effective May 10. Restricts acceptance or delivery of portable conveyors or parts to those covered by purchase orders bearing a preference rating of AA-5 or higher if placed with or accepted by a manufacturer or dealer on or after May 10; or an A-1-c or higher rating if accepted before that date. Purchase orders for the armed forces or other specified government agencies automatically become approved orders. Prohibits manufacture and delivery after June 8 of conveyor or parts unless manufactured in accordance with specifications and restrictions on the use of materials as prescribed in Schedule A of the order. This restriction does not apply to items manufactured before May 10 to a point where other use of the particular item is impracticable; or to any purchase order accepted by the manufacturer prior to May 10 and delivered before June 9. Exempts parts for repair and maintenance up to $300 for any single portable conveyor.

Priorities Guide

This issue of STEEL is in two sections, Section II being a 48-page revised Priorities Guide which digests the rules and regulations of CMP and the currently effective orders of WPB and OPA pertinent to the metalworking and metal-producing industries. In addition, it contains a personnel directory of WPB and OPA and a list of the district field offices.

Additional copies of the Priorities Guide are available free of charge in quantities less than 10 to all regular subscribers. In quantities of 10 or more they are 10c each.

—STEEL, Readers Service Dept. Penton Building, Cleveland, O

M ORDERS

M-9-c (Amendment): **Copper,** effective April 30. Transfers control of copper for use in production of automotive maintenance equipment to order L-270.

M-49 (Amendment): **Iridium,** effective April 30. Places all iridium supplies under allocation. Forbids use except as specifically authorized by WPB in contact points, fuse wire for detonators, electrical primers and laboratory use. Requires authorization of WPB for deliveries, receipts, and use, except in case of crude iridium which may be sent to a refiner and be refined without special authorization. An owner who already has received permission to use it may have it refined for himself on a toll basis and receive it back again without special authorization. Any person wishing to purchase iridium in any form or to use pure iridium metal from his own stocks must request special authorization from WPB as soon as possible and before May 10, indicating his requirements to fill AA-1 orders for May. After May, all applications for iridium in all forms must be made monthly on PD-868 and PD-869. The former calls for a statement of inventories and needs. PD-869 is a request for permission to use or acquire iridium; six copies must be filed. Dental alloys containing iridium, other than platinum-iridium alloys, are considered finished end-products and may be delivered and used without special permission. No more such alloys, however, may be produced.

M-21-e (Amendment): **Tin Plate, Terne Plate, and Tin Mill Black Plate,** effective May 3. Permits use of terne plate for maintenance and repair of roofing; and permits use of hot-dipped tin plate and electrolytic tin plate for current controllers. Adds Schedule B to the order, consolidating exceptions permitted in the previous order, either by specific provisions or exceptions through definition. Exempts black plate or sheet steel coated with lead recovered from secondary sources and containing not more than 2½ per cent residual tin. Eliminates requirement for filing forms PD-611 and PD-613, relating to long ternes. Monthly reports on PD-612 must be filed by producers and PD-614 by purchasers. PD-767 must be filed by producers when it is necessary to revise production schedules.

M-316: Bituminous Coal, effective April 30. Establishes control over deliveries of coal in transit. Prohibits such deliveries if receipt would increase receiver's stocks to more than 10 days' supply. Each person accepting delivery must give the railroad an undertaking in duplicate in the following form as specified in Appendix A:

In order to establish the right of the undersigned to receive delivery of bituminous coal under the restrictions of WPB order M-316 the undersigned certifies to .....
..... and to the WPB and the Interstate Commerce Commission that the undersigned has not, and will not have after receiving the coal identified below, more than a ten days' supply thereof as defined in said order. The undersigned (if not the original consignee of the coal) agrees, in consideration of receipt of such coal, to pay all obligations of the consignee to the consignor with respect to such coal and to pay to said railroad all applicable transportation charges, and other accessorial charges.

Date .....
Name of person receiving coal .....
Signature of authorized official .....
Identification of bituminous coal covered by this undertaking .....

Exceptions to the order are: coal for export, except that shipped by rail to Canada; coal consigned for water movement; coal consigned for use aboard a vessel; delivery to a connecting carrier; transactions specifically authorized by the Interstate Commerce Commission of the Solid Fuels Administrator.

M-318: Anthracite Coal, effective May 1. Provides that anthracite in transit to users who have more than five days' supply on hand may not be delivered but will be diverted by direction of the Interstate Commerce Commission. Similar certification and exceptions as are provided in M-316 are included in M-318.

P ORDERS

P-141-a: Public Sanitation Services (MRO Supplies), effective April 30. Authorizes builders to make house and project connections to sewage facilities if they meet limits and costs set forth under provisions of the order and if their municipal authority addresses to WPB a letter certifying that: the project is authorized under L-41; cost of material for sewer connections is less than $1500 for underground construction or less that $500 for other construction; connection is built in accordance with Housing Utilities Standards.

PRICE SCHEDULES

No. 82 (Amendment): Wire, Cable and Cable Accessories, effective May 8. Permits producers of rubber-covered wire and cable to quote higher than ceiling prices to reflect increases resulting from an authorized price increase for crude rubber. Prohibits producers from collecting prices which are in excess of ceilings at the time of delivery. Price increases were authorized April 1, 1943, for crude rubber going into commodities sold for government use.

No. 136 (Amendment): Machinery and Transportation Equipment, effective May 8. Provides uniform basis for computing labor rates in determining ceilings for installation of machinery, in cases where there have been no manufacturers' list prices for the installation, for labor performed under government or private contracts. Provides that the July 1, 1942, labor rates may be used in areas where the wage stabilization agreement of May 22, 1942, between the Building and Construction Trades Department of the A.F.L. and agencies of the government is applicable or where such rates have become the prevailing rates.

No. 310 (Amendment): Reusable Structural Steel Shapes and Plates, and Shafting, effective May 8. Assigns to salvaged assemblies of steel shapes the uniform ceiling price of 2.75 cents a pound established in the regulation for disassembled members but permits seller and buyer to gain the advantages that follow when the buyer can use the steel as assembled. Complete structures, such as bridges or building frameworks, are not included as "assemblies" under this regulation. Redefines "services" that may be charged for at a rate no higher than one-fourth cent per pound to mean either or both of: cutting to length or width of 12 inches or more; and drilling or punching holes up to one hole per 25 pounds or fraction of 25 pounds of steel in each piece drilled or punched. Exempts the dealer from rendering detailed invoices to buyers for sales of the reusable steel amounting to no more than $1.

Die Casting Prices Frozen at Past Year's Lowest Level

Danger of a rise in prices of die castings, 1942 sales of which totalled more than $90,000,000, has been averted by OPA through issuance of a regulation that freezes their prices at the lowest levels between April 1, 1942, and April 30, 1943.

Part of the industry's output is bought directly or indirectly by the Army, Navy and lend-lease. The castings at present are made principally of aluminum and magnesium and are used for starters, automatic pilots, brackets and other nonstructural parts of aircraft and automotive equipment, and for fuses and other components of ammunition.

As a portion of the industry's output is incorporated in combatant items it has been exempt from price control since July 1, 1942, under Supplementary Regulation No. 4 to the General Maximum Price Regulation. They now are transferred from jurisdiction of the General Maximum Price Regulation and supplementary regulations under it, and makes them all subject to Maximum Price Regulation No. 377, die castings, effective May 1, 1943.

Twenty-Five Per Cent Reduction Ordered in Third Quarter Estimates

A CONTINUING demand for materials outrunning the available supply was reflected in the third quarter allotments of Controlled Materials just completed by the Requirements Committee of WPB.

The allotments of controlled materials have been made to the 14 claimant agencies representing military and civilian requirements, lend-lease, and other exports.

Total requests from claimant agencies amounted to more than 20,000,000 tons of carbon steel while the estimated supply in the third quarter is slightly under 15,000,000 tons. The allotments of carbon steel made by the Requirements Committee are slightly above the estimated supply, to assure full use of all available materials and to create a pressure for reduction of inventories to an absolute minimum.

"The continued shortage of critical materials," Donald M. Nelson, WPB chairman said, "is emphasized by the fact that it was necessary to make an overall reduction of more than 23 per cent in the requests of the claimant agencies. It should be emphasized that these requests were carefully screened by each agency before presentation, and they represent only the amounts of materials which they could use effectively for war production if available. It is clear that we could utilize nearly one-third more carbon steel in the third quarter of this year than we are going to have. The situation is similar for alloy steel, copper, and aluminum, and therefore we cannot justify the use of a single pound of these materials for nonessential purposes."

The requests of the Army, Navy, Aircraft Resources Control Office and the Maritime Commission for carbon steel, taken together, were reduced by about 18 per cent in the allotments made by the Requirements Committee. All other requests, including those for export, were reduced about 27 per cent.

The estimated third quarter supply of materials allotted by the Requirements Committee included nearly 15,000,000 tons of carbon steel, about 2,500,000 tons of alloy steel, over 1,000,000 tons of copper products, and nearly 660,000,000 pounds of aluminum. Details of the distribution of these materials to claimant agencies cannot be given for reasons of military security.

J. A. Krug, WPB program vice chairman and chairman of the Requirements Committee, pointed out that the committee has once again completed its task of making quarterly allotments of materials to claimant agencies exactly on schedule, well in advance of the period in which the allotments will be used. The various claimant agencies will now immediately begin breaking down their allotments for distribution to producers under their jurisdiction, so that the producers will also know in advance the materials they will have available during the third quarter.

Another important step announced by Mr. Krug is advance allotments for future quarters to those claimant agencies which have firm programs.

"The Requirements Committee has authorized claimant agencies with approved programs to make commitments up to July, 1944, for materials in quarterly amounts equal to those allotted for the third quarter of this year," Mr. Krug said. "This puts into effect one of the basic principles of the Controlled Materials Plan, which is designed to bring about maximum production by permitting orderly scheduling many months in advance. CMP will thus go into full effect, as planned, on July 1."

Simplification Schedule for for Oil Country Tubular Goods

To help meet the increased demands for oil country tubular goods, WPB has issued a simplification schedule which cuts in half the number of permitted sizes and specifications.

Schedule 9 to Order L-211, national emergency specifications for steel products, limits the production of oil country tubular goods to a list of 168 items, based largely on a simplified list developed by the American Petroleum Institute. Formerly, more than 300 items were produced by the industry.

Schedule is expected to result in a tubular goods production increase of about 15 per cent and ease the burden placed on mills by requirements for pipelines, munitions and other essential equipment.

By folding instead of stitching the 10-cent Treasury war stamp albums the Government Printing Office has saved more than 5000 pounds of stitching wire. It now is pasting instead of stitching all jobs of 4, 8, 12 and 16 pages although thicker ones still are stitched. It is buying vegetable-tanned rather than chrome-tanned leather to save chromium.

War's Requirements Speeding Continent's Industrialization

AS HAS been indicated in recent issues of STEEL, the Latin American countries are expected to buy large quantities of United States manufactured goods as soon as priorities and shipping permit. Manufacturers also should turn their eyes in the direction of Australia. Industrialization of that continent, so sharply accelerated in World War I, is being developed to a much higher level in this war.

While censorship does not permit publication of current statistics it will be found at a later date, when the ban is lifted, that Australia is producing today much more pig iron than the 1,237,000 net tons she produced in 1939. She is producing much more steel than the 1,310,000 net tons she produced in that year. She also has facilities for producing large quantities of lead, zinc and copper.

Roughly, Australia now has in the neighborhood of some 27,000 manufacturing plants, large and small, that turn out a wide variety of products. In fact, that country has industrialized to the maximum extent permitted by her labor supply. She now has a population of some 7,000,000 people and has resources sufficient to support a large additional number.

There is every reason to expect further industrialization in the island-continent as time goes on. This is true particularly now that the war has proven that a small population is a factor of danger, so that Australia is likely after the war to encourage immigration. Current expectations are that many European families in the future will want to settle in a land in which they are sure of a welcome and in which they can earn a living. In particular, Americans should find a warm welcome.

A fact of special interest to American manufacturers is that Australians in this war have acquainted themselves with a large amount of equipment exported to them from the United States. Where formerly they bought their machine tools largely from Europe, particularly Great Britain, they have bought American machine tools in large numbers to equip their war plants. They have become accustomed to American standards and American practice. Those who are informed about this situation believe that a real opportunity for the continuing sale of American machine tools to Australia is possible. They suggest that American manufacturers will do well to think about sales potentialities there after the war is over, and about representation and service in that continent.

As has been stated, Australia abounds in resources. Her coal reserves aggregate some 57 billion net tons. Much of it is high in grade and a considerable portion is of coking quality. Most of this coal is fairly accessible to the consuming areas. Her known iron ore deposits come to some one billion tons although much of this tonnage is not immediately available because of problems of mining, transportation or metallurgical suitability of the ores.

For the present, development of Australia's iron and steel industry appears limited to New South Wales and South Australia. In those areas, however, the raw material situation is such as to warrant belief that the industry can be expected to expand over a considerable period ahead. Ore in these districts, incidentally, contains around 60 per cent iron on the average in its natural state.

Other minerals which Australia has in abundance are zinc, lead, copper, tin, aluminum and tungsten. She obtains supplies of chromite and nickel ore from New Caledonia, a French possession about 1000 miles to the east. One of the deficiencies that has a bearing on her steel metallurgy is a lack of molybdenum. She also finds it necessary to import vanadium. Nonmetallic mineral resources that the island-continent has in large quantities are clays, limestone, cement materials, dolomite, pyrites, refractories and mica.

Mining Important Industry

Mining not only now is one of the important activities in Australia but it is due to become more important. A program of some dimensions, for example, is involved in the development of iron ore fields not yet being worked. The same holds true for coal.

Australia now is feverishly at work trying to locate oil within her boundaries. Some oil has been found in Queensland, Victoria, and Western Australia but no gushers yet have come in. She now must rely wholly on imports; however, her oil situation has been assisted to some extent by erection of plants to produce power alcohol from molasses.

She has for several years past been talking about installation of an aluminum industry and it currently is expected that a project of this kind will be launched as soon as conditions favor it.

Australia is quite self-sufficient in plain carbon steel and rolls plates, shapes, bars and all other sections, including rails for the railroads. Her steel imports are limited largely to tin plate, of which she makes none, and alloys and tool steels; she also imports alloying elements.

As an example of the possibilities in the postwar economy, the case of the automobile industry may be cited. Today Australia is manufacturing large numbers of aircraft engines for trainer

Gun carriers like these are being turned out in quantity at Newport, the Australian Pittsburgh, and have seen service in many theatres of war, particularly in Africa. NEA photo

planes and two-engine bombers. That this is a significant development appears from the fact that prior to the war the country was not making any automobile engines but was importing them from abroad. Now that aircraft engines are being produced at home it seems possible that automobile as well as aircraft engines may be produced after the war. This prospect cannot be discussed effectively at this time because the size of the population will have some bearing on development of mass production lines.

Another possibility that seems to lie ahead is that Australia may become a producer of complete automobiles. Prior to the war, engines and chassis were brought in from the United States and Great Britain and assembled; the only Australian-made components added were the bodies and such items as springs, shackles, spark plugs, fan belts and certain other items.

On the other hand, Australia had plants that were making replacement parts. It seems logical that after the war, with the expanded supply of iron and steel, with the necessity of providing peacetime employment on a large scale, with a large supply of trained mechanics, with a large number of well equipped plants, Australia will develop industry even more intensively than in the past when agriculture was considered the most important activity.

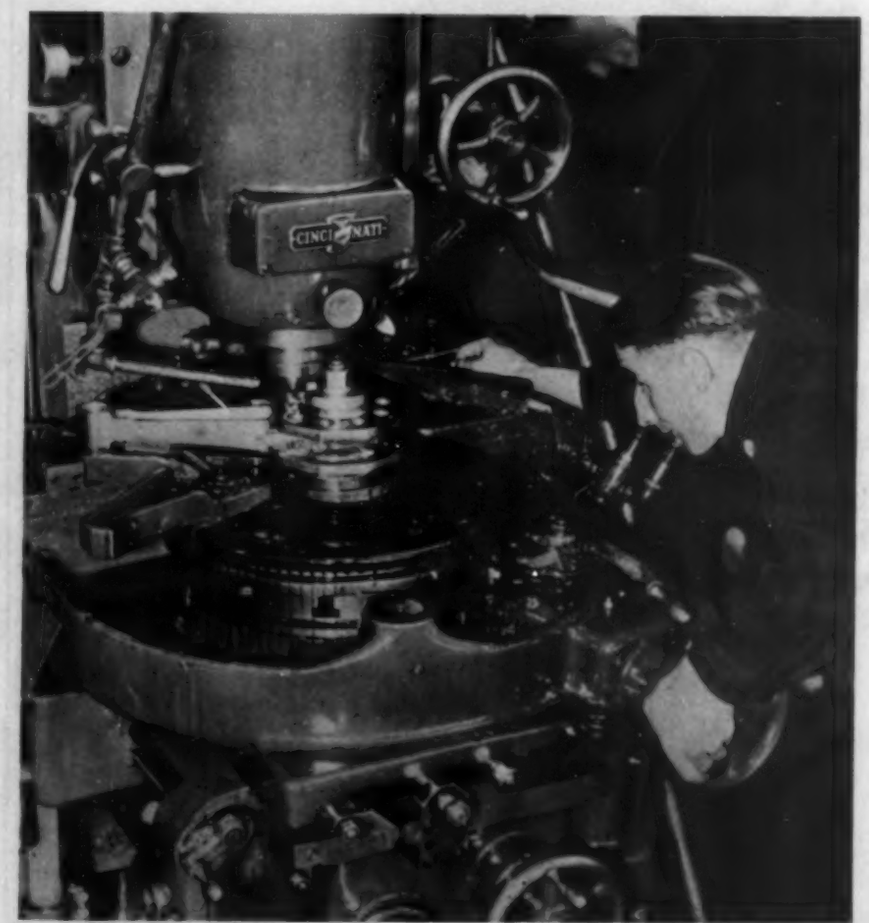
Range of products Australians are producing for war is broad. It includes not only the aircraft previously mentioned, and substantially all parts of such planes, but shells, field artillery, antiaircraft guns, naval guns, small arms, mines, aerial bombs, Bren gun carriers and many other items.

Prior to World War I Australia's industries were unimportant and such activities as agriculture and gold mining were dominant. During that war, facilities were set up that later became the basis of a greatly enlarged peacetime industry. The iron and steel industry, for example, was of small importance until it became necessary in that war to expand. Australia had been importing most of her agricultural machinery and farm tools at that time. After the war she developed an important industry for making a complete range of such equipment and in more recent years has sold such machinery in foreign trade, some to Asiatic countries and Latin America. This experience undoubtedly will be repeated in many other industries.

Shipbuilding, a fair-sized industry in Australia before this war, has been expanded considerably. Australia produces her own railroad cars and locomotives. In recent years she has enjoyed a rapid expansion in her electrical goods output.

As is implied in the foregoing paragraphs the country is completely equipped with industrial servicing facilities of all sorts, such as forge shops, iron, malleable and steel foundries, nonferrous foundries, die-casting plants, machine shops, etc., all available for a broader and more diversified manufacturing program after the war.

Growth in Australia's industrialization has been stimulated largely by numerous British and United States companies in establishing plants there. Names such as Nestles, Lever Bros., Wrigley's, Bryant & May, Wickers, General Motors, Henry Ford, Colgate-Palmolive-Peet, Goodyear, Dunlop, Kodak, Kayser, Lysaght's and Jantzen are household words in Australia.



American-made machine tools are aiding the Aussies in the manufacture of war material. Above, operator cuts profile of a master connecting rod for an airplane. NEA photo

Offers Trade Opportunities

On the basis of the theory that as countries undertake industrialization they become better customers—a theory so well proven by the exports we shipped to Russia during her five-year programs—Australia should provide us with increased trade opportunities in the future. This is a good time, therefore, to think about keeping Australian industry informed about American equipment, goods and services.

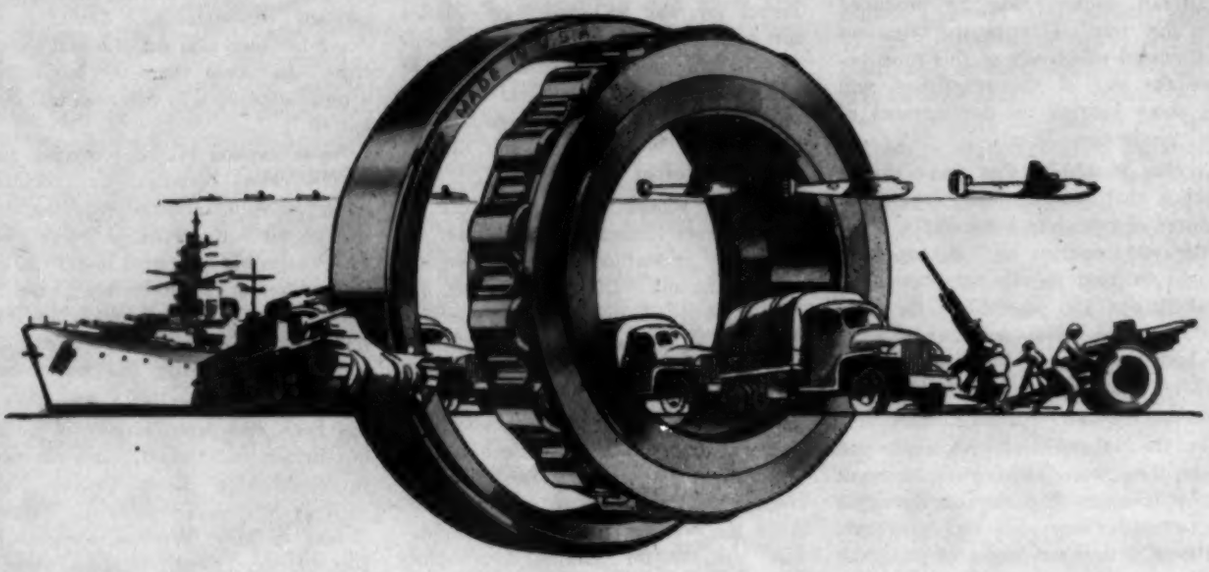
On the other hand, it also is advisable for American industry to study the possibilities of importing from Australia, not only because we will need many of her products after the war but also because of the basic fact that foreign trade has to be a two-way affair if it is not to bog down.

Surplus products which Australia probably will want to export include wool, hides, meats, fruit, dairy products, sugar, rice, raisins, wine, and certain mineral products.

Some years prior to the war Australia placed an embargo on exports of iron ore in order to conserve resources for her own future use. She has exported some pig iron and some fabricated steel. Coal has been exported to the surrounding Pacific areas but it is considered unlikely, in view of the claims of her own industries, that very large quantities will be shipped far afield.

Keeping Them Rolling—

Our Job Yesterday, TODAY and Tomorrow!



TODAY the heavily loaded shafts, gears and wheels of vital war equipment turning on Hyatt Roller Bearings, are well protected against shocks, excessive wear and breakdowns.

And other smooth rolling Hyatts, of the same microscopic accuracy and unyielding stamina, are serving round-the-clock in the machines which help build mighty guns and planes and tanks and ships.

Prolonging machine life . . . keeping equipment going . . . has been a job done well by Hyatts for the past fifty years. And after this war's won, there will be many more industrial, agricultural and transportation bearing applications in which Hyatts will continue to serve and save for another half century.

Is there any way we can help you now? Hyatt Bearings Division, General Motors Corporation, Harrrison, N. J.

HYATT ROLLER BEARINGS

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

General Motors builds M-5 tanks in Los Angeles from local parts and materials. . . Rapid growth of San Francisco causes acute transportation problem. . . Westerners enthusiastic about postwar possibilities

SAN FRANCISCO

HERE in the financial heart of the West Coast—the Paris of America as native sons used to call it—the problems of transportation, and particularly motor transportation, are acute, even more so than they appear to be in the South, as southern California is called out this way. War industries have boomed employment in the Bay area, seriously overtaxing municipal transport, and gasoline rationing has made the problem still worse. So the street cars pour up and down Market street on four tracks jammed to the doors with passengers hanging desperately onto rear steps. The Key System cars traveling over the Bay Bridge to Treasure Island and Oakland are packed day and night. To handle the throngs going to and from the Kaiser shipyards at Richmond, some old elevated railway cars of almost prehistoric vintage were purchased from the New York elevated system and pressed into service.

Highways in the entire area are badly congested, especially around the time of shift changes. Railroads are hard pressed to handle movements of troops and supplies, San Francisco being a principal embarkation point for the Pacific war theater.

Difficulties of transport are just one of the reflections of the impact of war on San Francisco, working changes which have been felt here more seriously than in most metropolitan areas. In southern California the change could be absorbed more easily. There was more room to expand. There were more people to start with. Business people in San Francisco readily admit the going has been especially rough in the last two years, but they shrug it off with, "Well, we're still alive; and this is only the beginning."

Tremendous Increase in Population

Manufacturing industries in the San Francisco industrial area in February were employing 261,500 wage earners, compared with 255,000 in January and 138,300 in February a year ago, an increase of 89 per cent in a year. Payrolls rose 121 per cent and were over five times the 1940 base.

During the past three years it is estimated that nearly 100,000 persons have settled in the San Francisco area and double that number in nearby counties. San Francisco population is just about 750,000 and the Bay area over 2,000,000. The state of California as a whole has seen a population increase of about 1,000,000 since 1940, making the current total better than 7,500,000. Importance of this basic change is all the more striking when it is realized that between 1930 and 1940 the population of San Francisco remained virtually static at 634,000.

This is one of the principal reasons why there is so much enthusiasm on the West Coast over possibilities for postwar manufacturing industry—acceleration in population figures plus the establishment of numerous large basic industries never here before—aluminum, magnesium, steel, shipbuilding, aircraft, etc.

San Francisco is known on the Coast as a "high price" town, the talk being that living costs are second only to Washington among all major cities. Certainly cost levels are well above those of southern California. This fact nettles old San Francisco residents and is probably due to a combination of circumstances. First, the city has become identified as the money and banking center of the West. Second, it is a stronghold of unionism which always makes for high prices. Third, it has had a war boom out of proportion to its size, which has had strong inflationary tendencies.

No matter where you go here or to whom you talk, the subject of Henry J. Kaiser comes up sooner or later. His influence is extending over an ever-widening circle of industry. Steel, ships, engines, aircraft, cement, magnesium, aircraft all figure in one way or another as a part of the rapidly-growing Kaiser empire. Among old-line companies in competing lines there is much resentment against the man, but this resentment seems slowly to be giving way to amazement as the Kaiser operations expand.

Kaiser Hires Capable Men

In all his activities he has surrounded himself with capable men—many of them only in their thirties but full of enthusiasm and drive—and once they have been "turned loose" on a job, "the old man" leaves them strictly alone, insisting on only one thing—results.

The stories about Kaiser are as numerous as the people you talk to. His own men will tell you he does not believe in publicity or advertising. Outsiders will mention incidents like Kaiser having his picture taken beside an airliner about to leave for Washington on an important and urgent mission and afterward pulling railroad tickets out of his pocket and heading for the depot.

Amusing and interesting though these stories be, they prove nothing. The real test of the Kaiser empire can come only after the war economy gives way to a peacetime economy and his plants go up against normal competition. Meanwhile, however, he is knitting together a formidable group of producing units and

M-5 light tanks, being built at a General Motors plant in Los Angeles, are shown nearing end of the assembly line

Section of a display of tools and parts for a tank job. Display emphasized prominent part played by Los Angeles subcontractors

using the profits on government to reinforce further the foundations of these units. In this sense the war is playing right into Kaiser's hands, because he is going to wind up with a diversified and well-equipped bunch of manufacturing plants, without having had to invest any great amount of his own money in them.

Important role many industrial plants and shops in the Los Angeles area are taking in the production of the M-5 light tank for the Ordnance department was revealed in a graphic way recently by the Southern California Division of General Motors Corp. to civic and industrial leaders, suppliers and subcontractors.

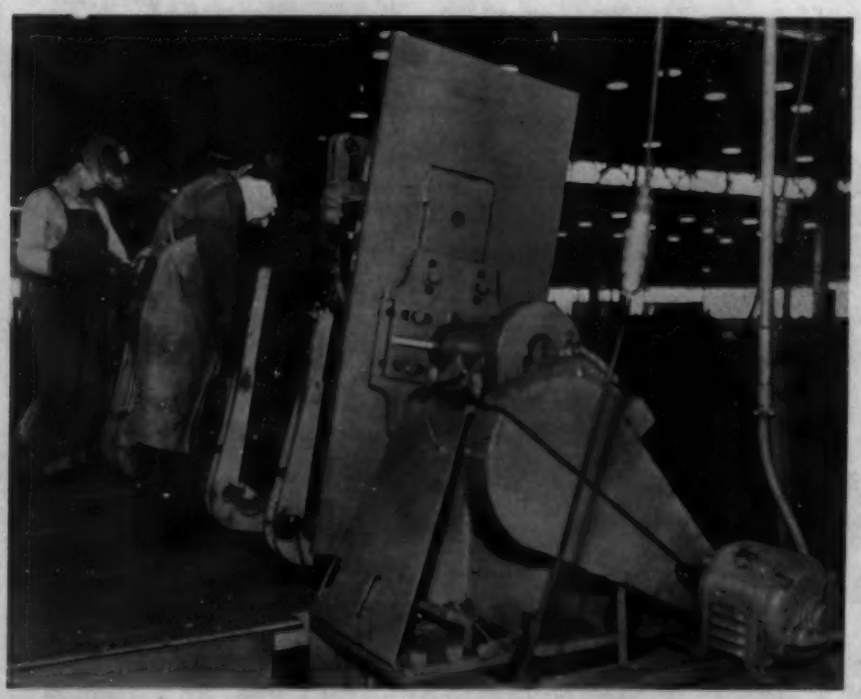
Activities included a luncheon at the plant in South Gate, followed by a tour where the guests saw the M-5 tank in production; a visit to a display of parts and materials produced in Los Angeles by suppliers and subcontractors, and a visit to the test track adjoining the plant.

Henry L. Clark, general manager of the South Gate division revealed the widespread participation of southern California companies in the important production job.

Over 50 per cent of the cost and 61 per cent of the weight of the completed California M-5 tank comprises materials or supplies made or purchased in Los Angeles. With the exception of the motive power and transmission units, practically all major items are of local origin.

General Motors, Mr. Clark said, has seven major subcontractors, principal items manufactured in the area being gun mounts, steel castings, armor plate and armor castings, bogie axles, turrets, track and track parts, and jigs and fixtures for production and assembly. These seven major subcontractors in turn have many subcontractors and suppliers.

The history of the M-5 production at Los Angeles dates to early last year, when it was announced the plant had been awarded a contract by the Cadillac Division, with the local facilities to be used. In early summer, the first tank was built and soon after the tank assembly and allied operations began on a moving assembly line. That the M-5 was being built in California was not publicly announced until Jan. 29.



Here a workman is shown welding with the aid of a special welding jig, built on the West Coast, used in the production of the M-5 light tank at the General Motors plant, Los Angeles

Kaiser Plant to Tap First Open-Hearth Heat on May 14

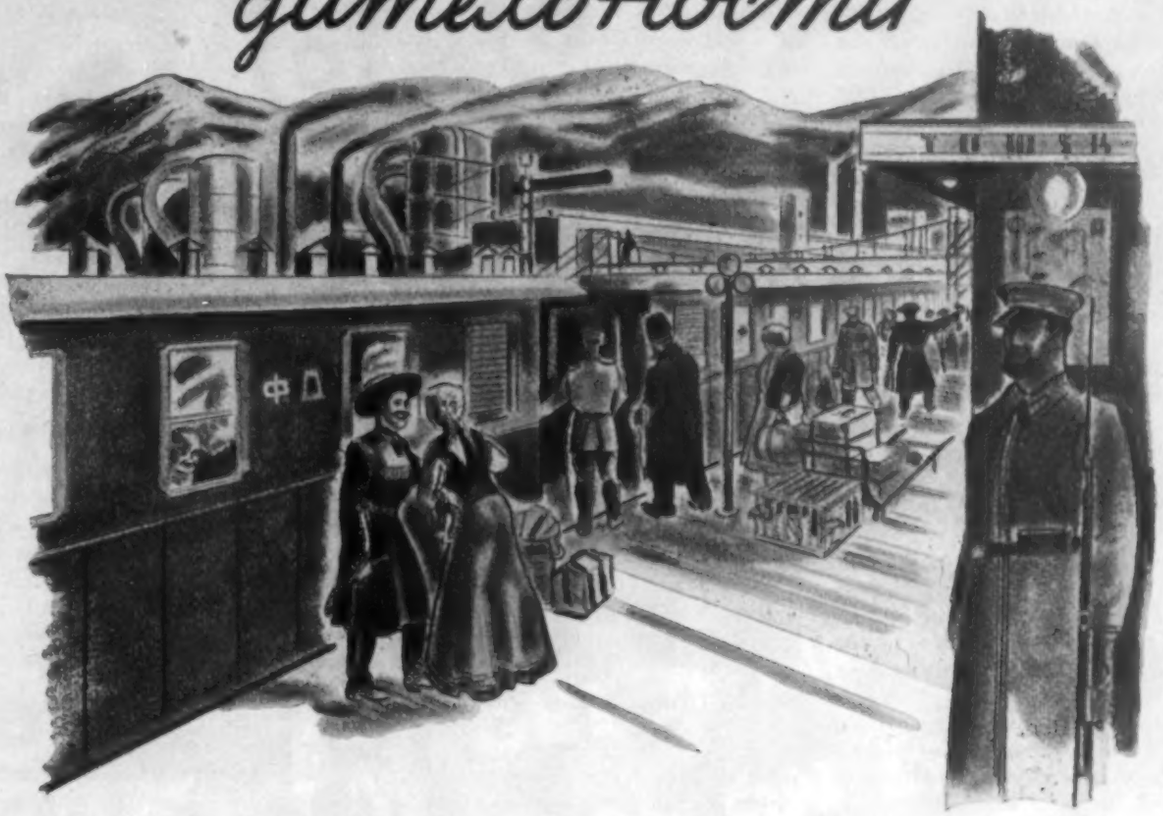
One by one the units at the iron and steel division of the Kaiser Co. Inc., Fontana, Calif., are swinging into operation. On Dec. 30, 1942 the torch was applied to the 1200-ton blast furnace, the first cast of iron having been taken from the stack Jan. 1, 1943, as announced in the Jan. 11 issue of STEEL, page 51.

On Friday, May 14, the first basic open-hearth heat will be tapped from one of the six 185-ton furnaces comprising the steelworks. The event will be witnessed by officials of the company and invited guests.

Following the pouring of the first ingots a buffet supper will be served in the executive suite of the administration building. Henry J. Kaiser will address those present.

The open hearth to yield the initial cast of steel at the Kaiser plant is one of four in the first group of 185-ton stationary furnaces. Two additional 185-ton units are under construction, a stationary and a tilting furnace. The tilter is to be used for alloy steel production.

"Мудрость предусмотрительности"



This caption may puzzle you. It is the most quoted German proverb, best remembered by the Russians. Above, it is lettered in Russian script, reading "FORESIGHT IS THE MOTHER OF WISDOM."

Russian industrial development in and beyond the Urals was planned as a protection against the inevitable conflict which began in June, 1941. The industrial cities of Uralsk, Magnitogorsk, Omsk, Sverdlovsk, Ufa, Kuibyshev and a dozen others, furnished equipment from an area beyond reach of the strongest military power in Europe. Hence it was Russia's WISDOM OF FORESIGHT that prevented defeat in the Fall of 1941.

If American industry possesses a comparable WISDOM OF FORESIGHT in planning POSTWAR operations, then private enterprise, with its renewed public confidence, will move forward with amazing advancement for the general welfare, in the traditional American way.

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THERMALLOY THE "EYE" OF QUALITY

WING TIPS

Welded steel tubing as formerly used in production of automobile torque tubes now adapted to intake pipes for radial aircraft engines. . . Scarcity compels abandonment of seamless steel tubing

HOW a standard fabricating process developed for automobile production was adapted to aircraft engine requirements makes an interesting "conversion" as told by engineers of the Buick Motor Division, Flint, Mich. It revolves around the use of welded steel tubing once used in the manufacture of automobile torque tubes for intake pipes in the Pratt & Whitney radial aircraft engine.

These intake pipes are about 2½ inches in diameter and are bent at right angles to lead the fuel mixture from the central manifold to each of the 14 cylinders in the engine. The intake manifold is at the rear of the cylinder banks, so the intake pipes leading to the front bank of cylinders are slightly longer than those connecting to the rear bank; otherwise the pipes are identical.

Originally, the pipes were formed from seamless steel tubing, but when supplies of this material appeared to be growing critical, Buick engineers began to investigate the possibilities of welded tubing. This tubing is formed and welded from a coil of S.A.E. 1010 strip steel. A spot welder is used to stitch together succeeding coils of steel which are fed into six roll stands to form the tubular shape, then through a seam welder and finally through four more roll stands for accurate sizing, and to an automatic cutoff at the end of the line. This is the identical equipment once used to form automobile torque tubes and was built by American Electric Fusion Corp., Chicago.

Fig. 1 is a closeup of the automatic cutoff mechanism, with an operator holding a section of tubing for one of the aircraft engine intake pipes. The tubing

Fig. 1—Tube as cut off after welding

feeds up against a stop and six circular cutters are automatically advanced to cut off the correct length.

To form the elbow shape, the tube section first is flanged at one end and normalized, then locked in a standard type of tube bending machine which pulls it around a central die to form the right angle as shown in Fig. 2. As might be imagined, the strain on the thin tubing is terrific in this operation, and the metal actually creaks as it is forced around the die. Good steel quality and a special lubricant, however, have reduced spoilage to a minimum in the production of the welded steel tubing. The process has removed the great need for seamless steel tubing.

In the bending operation there is the natural tendency of the tube wall to wrinkle and to be distorted from a true circular shape. To correct these deficiencies as well as to size the formed piece accurately, the pipe is chucked in a locking die in a crank press and a series of six steel chaser balls and one sizing ball are pushed through the tube by a plunger on the ram of the press. Naturally it requires some pressure to force the first ball through the full length of the distorted tube, but succeeding balls pass through easily. This setup is shown in Fig. 3.

Sandblasting Machine Scours Tubes

Before painting, the shaped tubes are mounted on fixtures on a conveyor and moved through an automatic sandblasting machine which thoroughly scours both inside and outside surfaces. After one trip through the sand blast the pipes are turned end for end in the fixtures and passed through the blast machine again to insure thorough cleaning. Fig. 4 shows this equipment.

The pipes are given two coats of paint, a yellow primer and a finish coat of black enamel. All painting is being done by the spray method, the tubes being suspended on conveyor hooks and passing along a series of water-wash spray booths. The tubes make two trips past the spray booth, being turned end for end after the first circuit so that the spray operators will not get paint on aluminum

Fig. 2—Close-up of a tube in bending machine

Fig. 3—Close-up of ball press

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"increases tool life 70% . . . improves finish!"

Now it's a production race to make every man-hour count . . . to make every machine produce at maximum capacity. And in many plants throughout America Sunicut has provided the answer!

Take one plant that switched to Sunicut as an example. They had been using a competitive cutting oil on their Jones & Lamson turret lathes for turning and threading. Tool life was poor . . . finish was not satisfactory. But all of this stopped when a Sun Oil Engineer—one of those Doctors of Industry—had them change to Sunicut.

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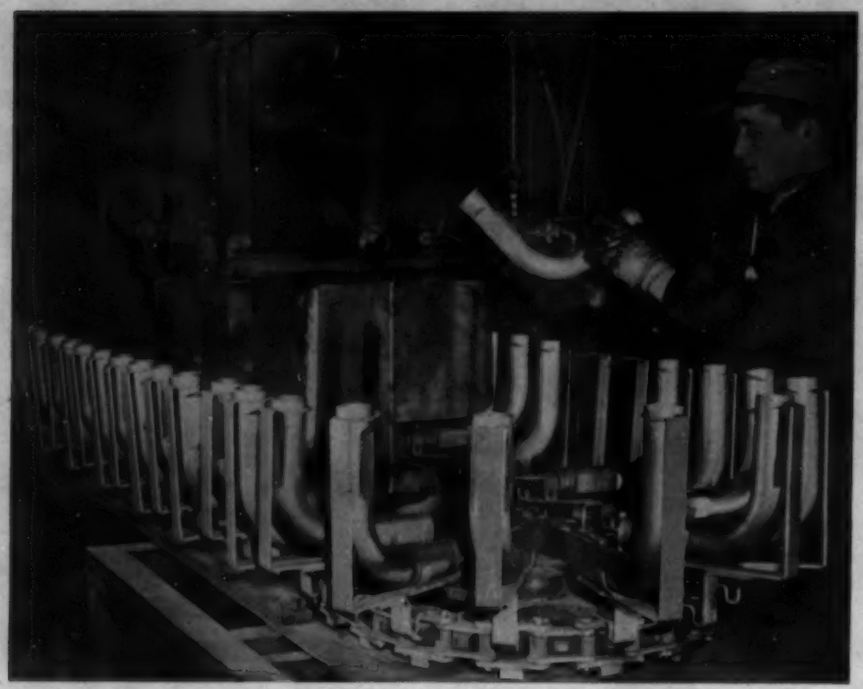


Fig. 4—Shot blast machine for cleaning pipes

connecting nuts. After painting, the pipes are oil sprayed inside to prevent rust in shipping to engine assembly. The welded pipe, according to the engineers, provides uniform wall thickness essential to the function of the part and eliminates wall pockets that might retard the flow of fuel mixture to the motor.

Warns Nation Against "Postwar Bankruptcy" of Plane Industry

Caution against a repetition of the World War I postwar treatment of aviation was sounded by Ralph S. Damon, president, Republic Aviation Corp., Farmingdale, N. Y., speaking recently to the Harvard Business School Club, New York. Following World War I, he said, "the aviation industry was allowed to go into bankruptcy *en masse* and nobody seemed to care much except, naturally, those in the industry. Is it any wonder that we are now trying to buy back yesterday?"

Damon stated that a similar situation can be easily avoided at the conclusion of this war provided there is established at this time a strong forward air policy which will enable the aircraft manufacturers to set their sights and prepare now.

"While some announcement from the United States Committee on International Air Policy may be forthcoming, the various aircraft companies are faced with the problem of planning for the future. They must do this if they are to survive."

Damon also pointed out that following the war approximately 37 per cent of the entire population of this country will be undergoing an economic adjustment.

"I will state that part of our anxiety is selfish, which is natural, but it is further motivated by our desire to fulfill, if possible, our obligations whether actual or moral to aviation's more than a million workers."

In speaking of contract renegotiation, Damon urged that "price adjustment boards in determining 'excess' profits should fully eliminate reserves properly established and protected for post-war conversion, development and construction. While we have every reason to hope that this war will be the last, history teaches us that this can hardly be the case and while the United States will win this war and the peace to follow, I fear we may easily lose the next war even as did France in 1940 by socialization and stagnation of our defense industries deprived of private capital and initiative by an unwise economic policy at this time."

Tantalum Processed from New Mexico Ores

The increased supply of rare tantalum for special carbides and electrical equipment will be made available to war plants as result of a discovery of tantalum ore in New Mexico by a private geologist, and research work conducted by the Bureau of Mines in its pilot plant at Rolla, Mo. Tantalum, a metal scarcer than gold, is noted for its extremely high melting point and its acid-resisting qualities.

While examining a mine in New Mexico, the geologist found a tantalum mineral in the pegmatite deposit of the area. He submitted a sample of the ore to the Bureau's pilot plant at Rolla. A high percentage of tantalum was indicated.

Four tons of ore were used in early beneficiation tests by the Rolla chemists and engineers and pilot plant "runs" were continued until all the kinks in the treatment process had been ironed out. Altogether, 30 tons of ore were handled and more than 3 tons of high-grade concentrate were produced.

Today the concentrate is being stockpiled at Rolla awaiting removal by the Metals Reserve Co., which is paying the geologist $3.50 a pound, or $7000 a ton, for the beneficiated material. . The geologist reports he plans to develop his property and install equipment to utilize the Bureau's process in turning out concentrate if sufficient reserves are indicated.

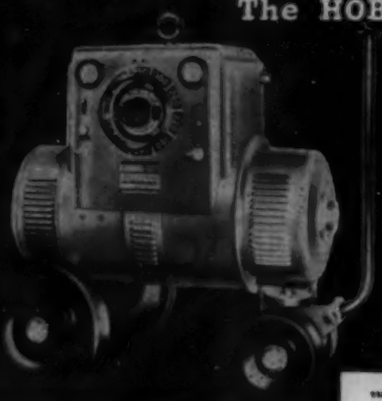
In past years much of the tantalum used in the United States has been imported. Because of its rarity, tantalum remained a laboratory curiosity for a long time. Its first commercial use was in filaments of electric light globes, and then it leaped to prominence because of its widespread use in radio tubes. Carbides of tantalum are used in wire-drawing dies, in steel-cutting tools, in wear-resistant parts of machines, and in dies for cold-nosing artillery shells. Because of its power to resist corrosion, tantalum is in high demand by manufacturers of surgical and dental instruments, electrical contacts, pump and valve parts, and temperature control apparatus.

Aluminum Co. Offers Use Of Heat Treating Processes

Aluminum Co. of America has announced the expiration of two of its patents, Nos. 1,508,556 and 1,572,487, covering heat treatment of aluminum alloy castings. They are especially important to the aircraft industry in casting high strength structural parts, structural fittings, crank cases, cylinder heads, and small engine parts.

Licenses under a number of the company's unexpired patents relating to heat treatment of aluminum base alloy castings are available through its sales offices, royalty free for the duration. Complete information regarding heat treatments covered by the expired patents is at the disposal of interested parties, and booklets containing detailed data pertaining to the various methods of heat treatment are available to all licensees.

The HOBART Arc Welder talking...



"It doesn't take my new operators long to get 'GOOD'."

"That's all because of the way I'm built. There's been a lot of engineering effort put forth on every single part of my advanced design. I have features that no other welder has, and that makes it easy as ABC for these beginners to get the best out of me."

Rows of Hobarts on a space-saving mezzanine attest to value of exclusive Remote Control (shown above). Proper range quickly pre-selected, then exact combination is obtained at the work.

The thousands of new women operators prefer Hobart Welders because they're "Simplified." Easy to control, easy to get top quality welds in all positions on all metals. Faster, too, with less rejects.

POST-WAR NOTES

To help you plan your post-war products around economical welded construction we have prepared a series of data sheets entitled "Practical Design for Arc Welding." Every executive interested in Arc Welding should have them. Just ask to be put on our mailing list.

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A complete new textbook, training course, and daily reference manual on all methods, procedures, etc. Valuable to every metal working man. Sent on 5 days ... *Free Examination offer!*

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Send information on items checked

- ☐ Electric Arc Welders
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Make a weekly tour of your plant for new scrap ideas, then get your committee to work on them. Let's scrap the Axis.

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HOBART *"Simplified"* ARC WELDERS

"with the Original and exclusive Remote Control"

One of the World's Largest Builders of Arc Welders."

Wood blocks are inserted in the ends of the pipe before shipment to prevent interior corrosion at Republic's Youngstown plant

Lightweight Tubing Helps Solve War Fuel Transportation Problems

LIGHTWEIGHT, rubber-jointed, portable pipelines are helping to solve the problem of transporting gasoline, oil and water to United States' fighting forces in Africa.

The streamlined pipelines are an innovation of World War II, although heavier lines were used by the British to supply their forces in the Arabian desert during the first World war.

Army officers, struggling with the problem of supplying fuel for mechanized units in the desert, first suggested the portable lines. They wanted pipe so light that it would not use too great a tonnage of steel, nor too much cargo space, and that could be laid without field welding and repaired easily.

The problem was put up to Republic Steel Corp., whose engineers designed a pipe of thin skelp—14-gage material, or not much thicker than an automobile fender.

Produce Tons of Special Pipe

The pipe is produced in substantial tonnages at the Steel & Tubes Inc., manufacturing division at Cleveland, by the electric weld process and then shipped to Youngstown for finishing into the military pipelines.

Because the walls of the pipe are too thin for threading, nipples made of heavier steel are welded to the ends of the pipe. A rubber coupling is used to connect the two nipples. Thus in laying the pipeline, it is only necessary to press pipe-ends into the rubber coupling.

Pipe sections are 20 feet long and weigh only 80 pounds, permitting a couple of soldiers to pick up a section and run easily with it. Should the line be damaged by bombing or by sabotage, its repair is a simple matter that can be accomplished by soldiers in the field without special tools or equipment.

Much of the work in making the new pipe is being done by women.

Rubber As Conductor of Electricity Developed

Rubber which acts as a conductor of electricity rather than as an insulating material is being used in a large electrical cable developed by American Steel & Wire Co., U. S. Steel subsidiary. It permits transmission of higher voltages for operation of X-ray machines and heavy industrial equipment.

Problem of carrying off static electricity as rapidly as it comes from the conductor was encountered by the company's research experts. To overcome the difficulty, it developed a semi-conducting rubber which is placed between metallic shields and the insulation to carry off and dissipate the discharge from the conductor before any damage to the insulation can take place. After much study and experimentation a carbon of the proper type was found and introduced in the product which gave some degree of conductivity without sacrifice of typical rubber-like physical properties in the new development.

Women workers, dressed in heavy clothing, spray the thin-walled pipes with conventional Army colors which make the line difficult to see from the air

MEN of INDUSTRY

DR. H. L. FREVERT

FRANCIS BRADLEY

GEORGE E. SMITH

WILLIAM H. HARMAN

Dr. H. L. Frevert, formerly president, Midvale Co., has been made chairman of the board. He will be succeeded by **Francis Bradley,** formerly vice president. **George E. Smith** has been promoted from general superintendent to vice president.

—o—

Dr. Willard Henry Dow, president, Dow Chemical Co., has been selected by Columbia University as the Chandler lecturer and medalist for 1943. Citation accompanying the award named him "one of the outstanding industrialists of the present generation". Dr. Dow is the twentieth lecturer and medalist and will speak at the university on May 20. He is also president and director, Midland Ammonia Co., and Dow Chemical of Canada Ltd., director of Dowell Inc., Dow Magnesium Corp., and Dow Corning Corp.

—o—

Y. R. Yarnall, formerly with Bellanca Aircraft Corp., New Castle, Del., and **H. H. Savage,** Philadelphia attorney, were elected treasurer and secretary, respectively, of Kellett Autogiro Corp., Upper Darby, Pa. **William F. Palmer,** secretary and treasurer of corporation since 1929, resigned recently and is now associated with Luscombe Aircraft Co., West Trenton, N. J., in similar capacity.

—o—

S. Leroy Crawshaw has been made manager of the Lynwood plant, Western Gear Works, Lynwood, Calif. For past 24 years Mr. Crawshaw has been with Westinghouse holding posts of sales engineer, applications engineer, chief engineer and more recently, manager of engineering, Nuttal Works, Pittsburgh. Mr. Crawshaw is chairman, general standards committee, American Gear Manufacturers' Association of United States and represents the association on the mechanical standards council, American Standards Association.

—o—

T. F. Thornton has been made president and director, Standard Tube Co., Detroit, to succeed **George B. Storer** who has resigned to accept commission as lieutenant commander, United States Navy. Formerly vice president, Mr. Thornton has been identified with automotive and steel industries for past 35 years.

—o—

Earl L. Mefford, district manager, New York area, Goodyear Tire & Rubber Co., has been made head of Washington office as assistant to vice president.

—o—

Carl E. Cromer, formerly open-hearth superintendent, Granite City Steel Co., Granite City, Ill., has been appointed assistant open-hearth superintendent, Laclede Steel Co., Alton, Ill.

—o—

Herbert M. Rich Jr. has been made district manager, Electro Metallurgical Sales Corp., New York. Previously, Mr. Rich was employed by Hickman, Williams & Co., Detroit, in charge of sales of ferroalloys, pig iron and metallurgical coke.

HERBERT M. RICH JR.

—o—

W. P. Albaugh, formerly open-hearth superintendent, American Rolling Mill Co., Ashland, Ky., has become associated with Miller & Co., 332 S. Michigan avenue, Chicago.

—o—

William H. Harman has been elected president, William Sellers & Co. Inc., Philadelphia. Associated with Baldwin Locomotive Works since 1923 and serving as vice president in charge of sales for past five years, Mr. Harman will remain as a director. He also is president, Diesel Engine Manufacturers' Association, and member of American Society of Mechanical Engineers.

—o—

John Wolcott Haddock, formerly vice president, Sullivan Machinery Co., Claremont, N. H. and Michigan City, Ind., has been made president, Farrel-Birmingham Co. Inc., Ansonia, Conn.

—o—

Ralph Z. Sorenson, Chicago, has been made manager, table appliance department, Westinghouse Electric Appliance Division, Mansfield, O., to succeed **John A. Sullivan** who resigned to become a lieutenant, United States Naval Reserve. Mr. Sorenson joined Westinghouse as supervisor of major accounts for Northwestern district.

—o—

John L. Carter has resigned as special consultant on gray iron and malleable iron foundry industries, Office of Price Administration, Washington, to return to his former business as foundry cost consultant at Newark, N. J. Arrangements have been made with the Gray Iron Founders Society whereby

Mr. Carter will direct and conduct its cost program. Since 1916, when he entered the foundry industry as manager, Barlow Foundry, Newark, Mr. Carter's principal interest has been cost accounting. He served as chairman of the cost committee, Gray Iron Institute, for several years and was cost advisor to the National Code Authority of the gray iron foundry industry. Mr. Carter joined OPA in January, 1942.

R. J. SWARTOUT

L. W. BRANN

HARRY THORSON

—c—

W. B. Muse, for several years sales manager, Sterling Tool Products Co., Chicago, has been named sales manager, Industrial Abrasives Inc., Chicago.

—o—

J. Stuart Sneddon has been named vice president in charge of sales, H. K. Ferguson Co., New York. Formerly vice president in charge of construction, he will be succeeded by **Clarence McDonough** who will resume his former position, having previously been assigned to special work with synthetic rubber and ordnance plant construction. Prior to joining Ferguson Co., Mr. Sneddon was president, American Type Founders Inc.

—o—

H. Parker Sharp has been appointed general counsel for Jones & Laughlin Steel Corp. Mr. Sharp was formerly associated with a Pittsburgh law firm. He joined Jones & Laughlin in June, 1942.

—o—

W. E. Zimmerman has been made general manager, Greer Steel Co., Dover, O., and **H. R. Walter** has been made treasurer.

—o—

John P. Maddigan, president, Buffalo Structural Steel Corp., Buffalo, has been elected president of the newly organized Hygrade Industries Inc., Buffalo.

—o—

Fred M. Hodd, chief statistician, Copperweld Steel Co., has been made superintendent of industrial relations, succeeding **J. J. Osten,** who resigned.

—o—

Walter F. Titus, a former vice president, International Business Machine Corp., has been appointed general plant manager, Sperry Gyroscope Co., Brooklyn, N. Y.

—o—

R. J. Swartout has been made vice president, Belle City Malleable Iron Co. and subsidiary, Racine Steel Castings Co., to succeed the late **J. M. Stone. L. W. Brann,** succeeding the late **Stanley Kitto,** has been made treasurer and **Harry Thorson,** purchasing agent, has been made assistant treasurer.

—o—

Benton G. L. Dodge, formerly vice president, Powermatic Ventilator Co., Cleveland, has been made manager of marketing, Adhere Inc., Los Angeles.

—o—

J. E. Fields has retired as vice president, Chrysler Corp., but will continue to serve as a director.

—o—

Frank E. McGary, chief, engineering and mechanical division, Murray Corp. of America, Detroit, has been made manager of Murray plant in Scranton, Pa., now under construction. **O. F. Graebner,** chief engineer, will succeed Mr. McGary.

—o—

A. M. Wibel, vice president, Ford Motor Co., has resigned because of ill-health. He was elected vice president in July, 1941, to succeed P. E. Martin who resigned.

—o—

Arthur B. Parnall has been made treasurer, Osborn Mfg. Co., Cleveland. With Osborn 17 years, Mr. Parnall successively held positions of chief accountant and controller.

—o—

H. F. Wardell, executive vice president, Detroit Steel Products Co., has been elected president to succeed **V. F. Dewey,** who has become chairman of board. **R. W. Weed,** Eastern sales manager, has been named vice president.

—o—

Fred L. Williams, formerly with Pratt & Whitney, and **Frederick J. Herr,** formerly with Vanadium-Alloys Steel Co., have joined the sales department, Darwin & Milner Inc., Cleveland. They will handle New England and Southwestern Ohio territories respectively. **Ray A. Lackner** will handle Pittsburgh territory.

OBITUARIES . . .

William C. Hoover, 57, consulting engineer and member of staff, Trundle Engineering Co., Cleveland, died recently.

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Alfred L. Eustice, 58, president, Economy Fuse & Mfg. Co., Chicago, died April 30 at his home in Evanston, Ill. He was a member of executive board, Illinois Institute of Technology.

—o—

Henry Douglas Reed, president, Bishop Wire and Cable Corp. and Bishop Gutta-Percha Co., New York, died April 28 in East Orange, N. J.

—o—

John T. Burrows, 58, vice president, Minerals Separation North American Corp., New York, died April 27 in Rapid City, S. D.

—o—

John Thuman McTarnahan, 59, pioneer in American aviation and president, La Mont Steam Generator Co., La Mont Licensing Inc. and Steam Power Inc., died April 29 at Larchmont, N. Y.

—o—

Adam E. Geddes, 56, president, Fowler & Wolfe Radiator Co., Norristown, Pa., died April 28 in Philadelphia.

Gray Iron Society Inaugurates Nation-Wide Accounting Service

GRAY Iron Founders Society has inaugurated a nation-wide program of cost promotion and cost service, general purpose of which is to promote use of sound cost accounting methods and a better understanding of cost accounting principles among gray iron foundries.

Issuance of OPA Maximum Price Regulation No. 244, with its requirement that every gray iron foundry must determine maximum prices for certain castings by a special pricing formula, makes it imperative that every foundry have a sound cost formula. One of the objectives of the program is to make it possible for every gray iron foundry to obtain a simple cost formula to meet this need at minimum cost.

The society has arranged to make its cost service available to every gray iron foundry, member or nonmember. An important feature of the program is a plan to render various types of cost service by mail based upon data submitted by mail. To insure that such data will be treated confidentially, the cost service will be handled by an independent consultant in co-operation with the society.

Heading the cost program is John L. Carter, a foundry cost consultant who has also been a foundry manager, and who is well known for his activities in foundry cost accounting, and as former special consltant to OPA.

The cost program was formulated by a committee consisting of the following foundry executives: C. R. Culling, president, Carondelet Foundry Co., St. Louis; H. L. Edinger, vice president, Barnett Foundry & Machine Co., Irvington, N. J.; Don McDaniel, vice president, Hamilton Foundry & Machine Co., Hamilton, O.; C. B. Magrath, president, Greenlee Foundry Co., Chicago; H. S. Washburn, president, Plainville Casting Co., Plainville, Conn.

Included in the program will be a series of mailings describing the cost services available to all gray iron foundries, distribution by mail of articles on various phases of gray iron foundry cost accounting and compliance with government price regulations; local meetings on foundry costs; and the appointment of a local cost committee in every foundry center, as far as possible, to assist the society in promoting the cost program.

The simple cost formula to be made available by mail to any foundry, even though it has never had a cost system, will be based on data furnished confidentially by mail to Mr. Carter. Practically any foundry will be able to supply the required information with but little clerical work. The cost formula furnished would give fairly accurate costs and would involve no clerical expense except that involved in using the formula to figure job costs. It would provide the basis for a pricing formula suitable for filing MPR No. 244 with OPA.

Another mail service offered is a "Report on Cost Methods." This will be based on information submitted by mail on forms provided for this purpose, giving a full description of the foundry's cost methods, class of work handled, etc. The report will point out flaws, if any, in the foundry's cost system; indicate possibilities of errors in arriving at costs; make recommendations for revisions in methods, etc. Other types of cost service by mail are under consideration and will be announced later. The society also offers personal consulting service.

A moderate charge will be made for the various types of service, charges to society members being on a lower scale than those to nonmembers. Additional information on the cost services may be obtained from the society's consultant, John L. Carter, 30 Central avenue, Newark, N. J.

PORTABLE LANDING MATS FORM BRIDGE AT U. S. AIR BASE

PORTABLE airplane landing mats are used to construct a temporary bridge over a swamp at an Army air base. Transports and glider planes flew in the open-mesh grating, developed by the Irving Subway Grating Co., Long Island City, N. Y. The mats were laid on wood stringers in jig time and provide a bridge strong enough to support heavy equipment

1942 Nonferrous Scrap Nearly Million Tons

Scrap metals dealers in 1942 supplied 951,027 net tons of nonferrous scrap to consumers, according to the Bureau of Mines. More than half was copper and brass, the remainder consisting of lead, tin, aluminum, nickel and magnesium.

Dealers' receipts of nonferrous scrap materials exceeded shipments to consumers by 21,214 net tons, resulting in a 23 per cent increase in dealers' stocks at the end of 1942 compared with the previous year-end. Total inventory of 112,140 tons Dec. 31, 1942, was only a 40-day supply, based on the December rate of shipments, showing that on the whole dealers observed the 60-day turnover clause in current regulations.

A sharp dip in dealer stocks during January and February, 1942, resulted almost entirely from unloading of copper-base scrap prior to new and revised price ceilings that went into effect Feb. 1 and 27. The general stock trend of all nonferrous scrap was upward for the remainder of the year. Trends were based on data gathered each month from a control group of 1126 dealers and figures in the bureau's report were expanded to cover virtually all the more than 4500 dealers active at the close of the year.

Electric Metal Makers' Conference Discusses Low-Sulphur Aircraft Steel

MORE than 100 melting superintendents, foremen, melters and second helpers on electric furnaces throughout the eastern half of the United States participated in an informal conference in Morrison hotel, Chicago, May 2. The meeting was sponsored by the Electric Metal Makers Guild Inc. in its expanded activities program and included a luncheon, a roundtable discussion, and a dinner.

The event was arranged by a special committee from the guild's Chicago section, consisting of Herman Schulz, superintendent of electric furnaces, South Works, Carnegie-Illinois Steel Corp., South Chicago, Ill., chairman; B. J. Aamodt, superintendent, National Malleable & Steel Castings Co., Cicero, Ill.; and A. J. Scheid, metallurgist, Columbia Tool Steel Co., Chicago Heights, Ill.

To stimulate open discussion, the roundtable was headed by two groups of experts, one experienced in steel ingots and the other on steel castings. Included in the ingot panel were: H. F. Walther, electric furnace superintendent, Timken Steel & Tubes division, Timken Roller Bearing Co., Canton, O., and national president of the guild; Harold Phelps, electric furnace superintendent, Rotary Electric Steel Co., Detroit; Joseph A. Scott, melting superintendent, Driver-Harris Co., Harrison, N. J.; B. E. Franke, superintendent of refining, International Nickel Co. Inc., Huntington, W. Va.; Mr. Schulz; and Mr. Scheid.

Members of the castings panel were: Fred J. Blaney, general superintendent, Ohio Steel Foundry Co., Springfield, O.; Martin T. McDonough, superintendent of melting, National Malleable & Steel Castings Co., Sharon, Pa.; James C. Schweitzer, superintendent, Sivyer Steel Casting Co., Milwaukee; George P. Messenger, metallurgist, Kensington Steel Co., Chicago; Eugene H. Weak, electric furnace superintendent, American Steel Foundries, East Chicago, Ind.; and A. G. Gierach, works manager, American Manganese Steel division, American Brake Shoe Co., Chicago Heights, Ill.

In the ingot symposium, presided over by Mr. Schulz, among topics discussed were refractories, melting, refining, and the like, but most of the proceedings were off-the-record. Nevertheless, one point of general interest was the current tendency toward low-sulphur in aircraft steels, it being pointed out that most German steels are now under 0.011 per cent in that element. Thus arises the question as to how the production of such low sulphur steels can be accomplished.

Consensus seemed to be that the answer is to be found in time, temperature and carbide slag. This, of course, will sacrifice tonnage, which is in strongest demand today. Some speakers believe part of the sulphur will have to be removed in the oxidation period. Also it might be done by putting lime in the ladle. One suggestion was that the Germans may be using strontium, which is not available in this country.

Mr. Aamodt conducted the castings symposium, most of which also was off-the-record. Some discussion centered on the present-day interest in boron in steel. No one seems to know the amount of this element which is retained in finished steel, and not too much is known yet about its use. It was pointed out that it should be applied in ladle additions to assure its making contact with the metal and not the slag. Little is known about the recovery obtained.

Executive Officers of Metal Trades Group Renominated

The three national executive officers of the National Metal Trades Association have been renominated to serve a second term, it was announced today by A. H. Timmerman, chairman of the nominating committee. They are Roe S. Clark, president; H. H. Kerr, vice president, and George A. Seyler, second vice president and treasurer.

Election of officers will take place May 27 in Palmer House, Chicago, during the forty-fifth annual convention and production conference, primary purpose of which is to stimulate war output. A record attendance of more than 600 leading industrialists is expected.

Mr. Clark is vice president and treasurer of the Package Machinery Co., Springfield, Mass.; Mr. Kerr is president of the Boston Gear Works, Quincy, Mass., and Mr. Seyler is vice president of Lunkenheimer Co., Cincinnati.

Councillors for two years also will be named. Nominees for this office are: Dwight K. Bartlett, Builders Iron Foundry, Providence, R. I.; C. B. Fitts, Standard Electric Time Co., Springfield, Mass.; Harry Arter, Arter Grinding Machine Co., Worcester, Mass.; Dana W. Norris, C. C. Bradley Co., Syracuse, N. Y.; William S. Armstrong, Henry Disston & Sons Inc., Philadelphia; R. A. Mitchell, Pittsburgh Forgings Co., Coraopolis, Pa.; Otto G. Hitchcock, Hays Mfg. Co., Erie, Pa.; J. I. Schultz, National Broach & Machine Co., Detroit; W. D. Hamerstadt, Rockwood Mfg. Co., Indianapolis; T. J. Morton Jr., Hoosier Lamp & Stamping Co., Evansville, Ind., and C. R. Rosborough, Moline Tool Co., Moline, Ill.

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American Institute of Chemists—Twenty-first annual meeting is scheduled at Edgewater Beach hotel, Chicago, May 15. Discussions on vital war products will include a talk by Dr. Bruce K. Brown, assistant deputy petroleum co-ordinator. Dr. Walter Savage Landis, vice president, American Cyanamid Co., will be presented the medal for outstanding service to chemistry.

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American Society for Metals—Regional meeting to be held in Hotel Taft, New Haven, Conn., May 22. Information and developments important to war production will be covered by the following speakers: S. C. Spalding, metallurgical engineer, American Brass Co., Waterbury, Conn.; Edward L. Wood, metallurgist, Springfield Armory; Dr. Zay Jeffries, chairman, advisory committee on metals and minerals, National Research Council, and Igor I. Sikorsky, engineering manager, Sikorsky Aircraft Co., Stratford, Conn. Mr. Sikorsky will talk on "Direct Lift Aircraft."

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American Society of Refrigerating Engineers—Low temperature applications of refrigeration will be emphasized in technical sessions at Hotel Statler, Cleveland, June 1-3.

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American Mining Congress—Two day war conference to discuss ways and means of producing sufficient coal to meet the demands of war plants and homes and to develop methods and plans for postwar coal production will be held at Cincinnati, May 17-18.

Westinghouse Planning Group To Study Postwar Activities

Discussion of postwar plans and development of wartime activities for distributors and retailers are the objectives of the nine-man planning committee appointed recently by Westinghouse Electric Appliance Division, Mansfield, O.

T. J. Newcomb, sales manager of the division and chairman of the new planning group, said such activities as appliance service, nutrition, conservation of materials and consumer education in care and use of electric appliances will be recommended to the company's distributors and dealers.

Members of the planning committee are: E. B. Ingraham, president, Times Appliance Co. Inc., New York City; H. B. Donley, general appliance manager, Westinghouse Electric Supply Co., New York; E. C. Brauning, vice president, American Sales Co., Columbus, O.; John Shaw, manager, Moore-Handley Hardware Co., Birmingham, Ala.; Henry Czech, district manager, Westinghouse Electric Supply Co., Chicago; T. F. Savage, president, Intermountain Appliance Co., Denver; J. H. Ashbaugh, division manager, and W. W. Grant, director of marketing research.

Lieut. J. Douglas Gessford, Navy, presents pennant with star to L. D. Canfield, manager of Westinghouse plant, Newark, N. J. Others in photo are: M. J. Gardinier, and Capt. W. H. Gardner

Union Metal Mfg. Co. receives the Army-Navy burgee for excellence in producing recoil mechanisms, gun mounts, bombs and other products, below

Displaying the flag presented to American Foundry Equipment Co., Mishawaka, Ind., are, left to right: O. A. Pfaff, company president; Commander H. O. Lord; Lieut. Harold B. Miller, Navy; J. Robert Bunch, president, local 995 UAW-CIO; Lieut. J. R. Grandfield; Ensign Robert H. Austin; Brig. Gen. Trelawney Marchant; and Ensign Paul T. Sprinz

Norton Co., Worcester, Mass., has received its second star for excellence in production. Left to right: Leonard R. Cutler, Alfred R. Messier, President George N. Jeppson, Howard W. Dunbar, Capt. Gordon C. Hall, Board Chairman Aldus C. Higgins, Harold M. Holdredge, Andrew B. Holmstrom, Harry E. Howard, Peter J. Styffe and Robert H. Hunter

McAlear Mfg. Co. Acquired By General Finance Corp.

General Finance Corp., Chicago, has acquired substantially all of the outstanding stock of the McAlear Mfg. Co., 1901 South Western avenue, Chicago, manufacturer of valves, regulators and control equipment used in high octane gasoline and synthetic rubber production as well as on ships. The company, which has assets of slightly over $500,000 and did a business volume of about $1,400,000 in 1942, will be operated as a wholly-owned subsidiary of General Finance Corp. Operations will be linked with the Climax Engineering Co., Clinton, Iowa, acquired last August as the first manufacturing subsidiary of the corporation in its swing from industrial banking to manufacturing. In February, General Finance purchased the Bi-Metallic Products Corp., Chicago.

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White Engineering Co., 2400 Stoddard place, manufacturer of airplane parts, has acquired space at 2601 Pennsylvania avenue for inspecting and packing its products.

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J. Faulkner Thomas, president, Thomas Truck & Caster Co., Keokuk, Iowa, has purchased the assets of Buffalo Pulley & Caster Co., Buffalo. The Buffalo plant will be operated by a separate corporation known as Buffalo Caster & Wheel Corp. Mr. Thomas is president and Lyle B. Miller, secretary-treasurer.

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Bantam Bearings Corp., South Bend, Ind., a subsidiary of Torrington, Co., Torrington, Conn., the past eight years, has been merged with the parent company and will henceforth be known as the Torrington Co., Bantam Bearings Division. The Bantam Division will retain present personnel and continue operations from South Bend.

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A 200 per cent increase in production of landing mats since Jan. 1 in the West Coast plant of the Irving Subway Grating Co. in Oakland, Calif., has been announced by plant officials. Although production is well ahead of schedule, there will be another 25 per cent increase within the next six weeks, it is stated. The plant was opened last December to facilitate the shipment of steel landing mats to Alaska and the Pacific area.

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Twenty-eight officers and seamen of the U. S. Navy graduated last month from a course in the operation and maintenance of a new-type turbine-electric propulsion unit which the General Electric Co., Schenectady, N. Y., is producing for a special purpose vessel. The company expects to train 1400 men in the course by the end of 1943. Classroom exercises are supplemented by actual study of the unit.

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L. T. Swallow & Associates, Detroit, have been organized to provide prime and subcontractors of war materials with a packaging and packing service, as sales representatives for International Plastic Corp., Morristown, N. J., and for Cadillac Bag Co.

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Sylvania Electric Products Inc. will open a new sales office in the Lincoln-Liberty building, Philadelphia, June 1, directed by Garlan Morse.

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Joseph B. McCann of the E. W. Bliss Co., Toledo Machine & Tool division, was honored at a dinner recently given by his business associates for 50 years of continuous service with the company. Four men with 50 years of continuous service were present, also a number with 25 to 45 years of service.

SALVAGE

TRAINEES at the Army Air Forces Technical Training Command center at Atlantic City, N. J., salvage the tiny wires used to fasten paper caps to their milk bottles. Here a soldier carries an accumulation to the camp salvage post. NEA photo

John M. Bush, Cleveland Cliffs Mining Co., Negaunee, Mich., and chairman in upper Michigan for WPB's industrial salvage committee, is directing a 15-day drive to collect surface scrap around mines in the upper peninsula iron and copper districts. The campaign began May 1. Scrap found around mine surfaces is mainly of the heavy-melting type.

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Pecker, Simpson & Gladeck, engineers, Philadelphia, have become associated with the Langley Aviation Corp., headed by Vincent Bendix. Both firms are performing independent research and development work on molded plywood ships.

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Cement Tile Corp., 608 South Dearborn street, Chicago, has been formed to manufacture and install precast concrete roof and floor slabs, with the following officers: C. S. Freund, president; L. J. Wilhartzn, vice president; A. Isherwood, secretary and sales manager; V. E. Baird, treasurer and chief engineer and O. R. Pritchett, assistant secretary and plant manager.

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S K F Steels Inc. has moved main office from 369 Lexington avenue, New York, to more spacious quarters in Graybar building, 420 Lexington avenue, New York.

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Wean Engineering Co. Inc., Warren, O., has moved from its offices in the Second National Bank building to recently purchased property at 347 N. Park avenue, that city. Expansion was due to the national defense work.

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Anthracite Institute will move from 19 Rector street, New York, to new quarters at 101 Park avenue, effective May 1.

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H. M. Harper Co., Chicago, has opened a factory branch in the I. N. Van Nuys building, 210 West Seventh street, Los Angeles, with Clarence A. Gauger in charge. Mr. Gauger was associated for seven years with the Los Angeles office of Pacific Metals Co.

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Continental Industrial Engineers Inc. have moved to new and larger offices at 176 W. Adams street, Chicago, Ill., on April 17.

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Tite Flex Metal Hose Co., Newark, N. J., has rented the plant of the American Encaustic Tiling Co. in Perth Amboy, N. J. The plant, a 1-story building of 110,000 square feet on 19 acres of ground, will be devoted to war work.

Two stockholders among the 175 attending the forty-second annual meeting of the United States Steel Corp. at Hoboken, N. J., and who partook of the traditional sandwich and apple pie luncheon were veterans Robert F. Smith and L. M. Feldman

Production Breaks All Records; Earnings Shrink Drastically

A PICTURE of sharp contrasts—production breaking all records, with earnings shrinking appreciably—was presented by Chairman Irving S. Olds, at the forty-second annual meeting of stockholders, United States Steel Corp., in Hoboken, N. J., May 3.

More than 1000 production records were established by corporation subsidiaries in 1942, he said. Yet the balance out of earnings carried forward for the future needs of the corporation was off approximately 78 per cent from the preceding year, $11,785,884, as contrasted with $56,138,390.

Preferred and common dividends for 1942 were at the same rates and in the same dollar amounts as for the preceding year, but employment costs, embracing wages, salaries, social security taxes and pensions, increased 25 per cent and federal, local and state taxes, 21 per cent.

"If there are to be material increases in employment costs or in taxes in the future," he said, "these increased charges can only be met by absorbing in part or in whole the returns to the stockholders and the balance for future needs, or by increasing prices of steel products. Prices of major steel products today are about the same as in 1939, although substantial increases in operating costs have occurred since that year."

The corporation's income last year, after income taxes and all charges except interest on debt, amounted to 4.48 per cent of the value of the net assets. The average return on this same basis for the five year period, 1938-1942, was 4.36 per cent of the value of the net assets. During the 42 years of the corporation's existence, beginning with part of the year 1901, the average was 5.08 per cent. Mr. Olds added that 1942 earnings were not necessarily final, as some change may result from a renegotiation of prices under certain contracts for products used in the prosecution of the war and from future adjustments of the provisions made for federal taxes, depreciation, amortization, and so forth.

Arthur M. Anderson, Sewell L. Avery, Philip R. Clark, Leon Fraser and Thomas W. Lamont, were elected directors for the three years ending 1946.

Stockholders saw in a new film a picture record of the corporation's vast war-time expansion. (See illustration and caption).

Outlining U. S. Steel's achievements

NEW U. S. STEEL FILM DEPICTS WARTIME EXPANSION PROGRAM

"To Each Other", a new motion picture which draws its title and theme from the closing pledge of the Declaration of Independence, and which depicts the expansion programs of the United States Steel Corp. soon will be released for public showing.

In 35 minutes, the film gives a resume of additions to existing plants, conversion of old plants to war production and progress being made in the construction of complete new units. Manufacturing scenes illustrate the production of armor plate, ship plate, bomb castings, shell forgings, pipe, tubing, wire rope and other wire products.

Walter Brennan, three times Academy Award winner, plays the part of a veteran steel worker who has returned to the mills for the duration.

Accompanying illustration, from the film, shows one of the corporation's new electrolytic tin plating mills.

STEEL PRODUCERS' FIRST QUARTER PROFITS OFF 24 PER CENT

Sixteen steel producers earned an aggregate of 24.1 per cent less in the first quarter of 1943 than in comparable three months in 1942, and 48.7 per cent less than the combined total for the first quarter of 1941. Compared with the fourth quarter of 1942 the reduction was 24.3 per cent.

Although seven of the 16 companies showed gains in the first three months this year over the corresponding quarter of 1942, the majority of these increases were relatively small. Reports attribute the drop to higher labor costs and taxes.

Producers with pig iron capacity only showed a loss of 22.6 per cent from 1942 first quarter profits. Decrease in net income after taxes and other charges from the first three months of 1941 was approximately 52 per cent.

	First Quarter 1943	First Quarter 1942	First Quarter 1941	Fourth Quarter 1942
United States Steel Corp.	$15,406,597	$27,921,534*	$36,559,995	$25,646,452
Bethlehem Steel Corp.	6,288,693	6,140,688	10,436,028	5,731,289
Jones & Laughlin Steel Corp.	2,399,369	2,491,718	4,160,507	2,550,257
Republic Steel Corp.	3,666,557	4,716,962	8,189,967	6,501,357
Youngstown Sheet & Tube Co.	2,147,023	2,576,579	4,576,197	2,978,354
Inland Steel Co.	2,796,321	2,689,090	5,469,046	2,607,482
National Steel Corp.	2,680,850	2,675,837	5,430,389	3,664,701
Copperweld Steel Co.	216,332	339,057	331,818	571,158
Wheeling Steel Corp.	961,391	1,200,090	1,981,009	1,606,657
Pittsburgh Steel Co.	600,121	645,384	889,700	599,839
Crucible Steel Co. of America	1,915,905	1,676,004	1,489,851	†606,598
Sharon Steel Corp.	445,564	250,302	527,253	434,476
Allegheny Ludlum Steel Corp.	1,419,240	915,644	2,720,164	1,986,858
Continental Steel Corp.	118,159	169,337	313,122	316,853
Keystone Steel & Wire Co.	220,854	564,085	410,137	265,355
Rustless Iron & Steel Corp.	820,000‡	671,479	581,698	757,132
TOTAL	$42,102,976	$55,443,738	$82,066,881	$55,611,617
PIG IRON CAPACITY ONLY				
Interlake Iron Corp.	$ 260,430	$ 444,762	$ 774,855	$ 237,808
Sloss-Sheffield Steel & Iron Co.	354,367	277,741	512,859	263,060
Woodward Iron Co.	251,815	397,337	551,897	675,566

‡Estimated. †Loss. *Actual net reduced approximately $8,000,000 by revision of income tax and allocation of larger share of pension fund payments to this quarter.

Mr. Olds said that rolled and finished steel production last year was again in excess of rated capacity and that ingot production was close to rated capacity. Production capacity of certain products was substantially increased during the year. Ingot production of 30,029,950 net tons in 1942 was 28 per cent larger than in 1916, the highest year of its ingot production during World War No. 1. The chairman referred to various accomplishments which have won official recognition by the War and Navy Departments and the Maritime Commission.

The net income of $71,818,569 compared with $116,171,075 for the preceding year, despite the fact that the revenue and services sold in 1942 was the highest in the corporation's history, being approximately $234,500,000 greater than in 1941.

The corporation expended last year $117,546,022 of its own resources for additions and betterments to properties, bringing the total since June, 1940, up to $282,000,000. In the same period, he added, the corporation has undertaken the construction of emergency facilities for government account involving an expenditure of $436,000,000 of government funds, making for an aggregate, involving the use of both government and corporation funds, of $718,000,000. Unexpended balances as of March 1, 1943, for such property additions and replacements to be paid for by the corporation, amounted to approximately $130,000,000.

Since the commencement of the national emergency, more than 70,000 employes have joined the Army, Navy and their auxiliary forces. The average number of employes last year of 335,866 was the highest on record. The payroll for these employes ($738,444,009) was more than 12 times the amount of the total preferred and common dividends paid for 1942. The total compensation for all executives receiving $10,000 or more a year during 1942, represented less than 1 per cent of the payroll for that year.

During the first quarter of 1943, Mr. Olds revealed, the average number of hours worked per week by all corporation employes was 40.7. The average hourly pay was $1.12 and average weekly earnings, $45.69.

Eastern Rolling Mill Co., Baltimore, reports first quarter net income as $123,226, after provision of $451,706 for federal and state income and excess profits taxes. Net is equal to 58 cents a share and compares with $190,331, or 91 cents a share, when taxes on income amounted to $160,994. For 12 months ended March 31, net totaled $406,058, against $489,714 a year earlier.

Bethlehem Building "a Ship Every Day, Including Sunday"

Bethlehem Steel Corp.'s shipbuilding program now is "a ship every day, including Sunday," according to E. G. Grace, president, at the company's annual meeting April 29. Mr. Grace said this schedule would be bettered if the company could obtain propeller machinery, valves and other equipment, and provided the company could obtain the necessary manpower.

More than 30,000 employes must be added to Bethlehem shipyards before the end of the year, Mr. Grace said. To net 30,000 new workers, he said, it would be necessary to interview 200,000 men and women—to compensate for those lost through induction into the armed services and those which fall by the wayside during training periods.

Bethlehem, at present, is employing 170,000 in its shipyards. Total employment is 282,000.

Bethlehem yards have started to deliver escort ships and will deliver "a substantial number" in the future.

Company expended only $2,250,000 for new facilities and betterments during the first quarter. Mr. Grace said the company had practically completed its program. "Nothing substantial" is in the works and the government-financed program is virtually completed.

While first quarter billings were around $432,700,000, more than $2,000,000,000 are in sight for the year, due primarily to expanding shipbuilding.

Colorado Fuel & Iron Corp.

March quarter net profit of Colorado Fuel & Iron Corp. totaled $416,389, after provision of $610,400 for federal income and excess profits taxes, equal to 74 cents a share. In the first quarter of 1942, after providing $719,400 for taxes, profit was $823,273, or $1.46 a share. Net income for nine months ended March 31 was $1,203,543, against $2,308,887 for comparable nine months last year.

American Steel Foundries

American Steel Foundries Co., Chicago, showed consolidated net profit for six months to March 31 as $1,393,796, after deducting $8,099,600 for federal income and excess profits taxes, equal to $1.17 a share on common stock. This compares with $2,513,208, or $2.12 a share, for the six months to March 31.

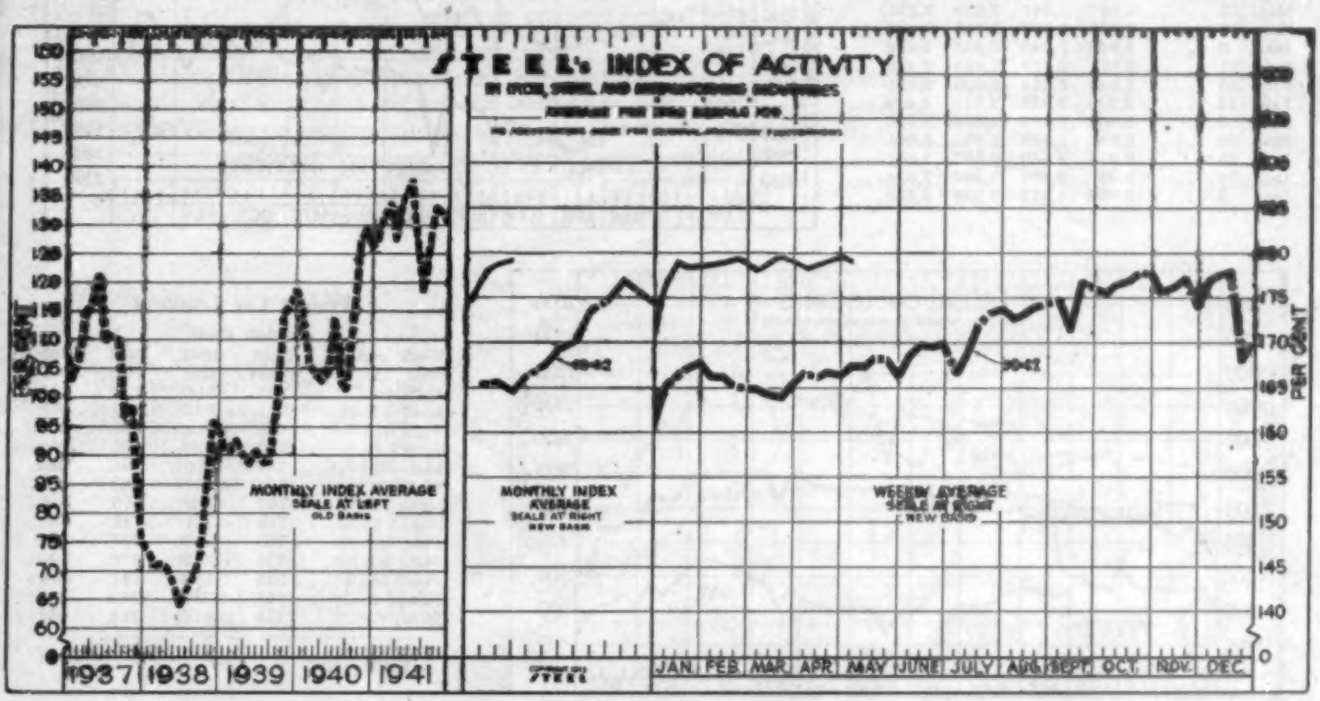
Railroads Set New Records Despite Equipment Cuts

IN 1942 railroads of the United States attained a new high record in average number of tons per carload freight as a result of a country-wide program whereby shippers and receivers united under ODT supervision to produce maximum efficiency in loadings and use of cars. The average, 40.1 tons per car, was the fourth consecutive annual record established by the carriers.

This record gains significance when the vast increase in war-stimulated demands upon railroads is weighed against their growing material and equipment difficulties. From 1939 to 1942 the volume of freight traffic increased by 91 per cent and passenger traffic by 134 per cent. Not only have rail carriers handled a greatly augmented tonnage of commodities that normally move by rail, but they have taken over much extra tonnage that formerly moved by water and highway. Traffic reports for first quarter 1943 show volume in that period to be substantially above the levels reached at the peak season of any pre-war year. Currently the carriers are performing one-fourth more freight and almost twice the passenger service of a year ago and are doing the job with what they believe to be an insufficient number of cars and locomotives.

When the railroads made up their new equipment programs for 1943, estimates of the amount of power units, freight cars, track and accessories were held to the lowest point consistent with requirements of the war production program. Despite this, their schedules were sharply reduced. WPB pared down a request for 3,354,000 tons of steel rails and accessories to 2,880,000 tons for 1943. Authorizations for freight cars in 1942 were only one-fourth the number required. The locomotive program was trimmed about 20 per cent.

Industrial activity receded slightly in the latest week as measured by STEEL's index which sagged 0.8 point to 178.5. This compares with 167.4 for like week a year ago.



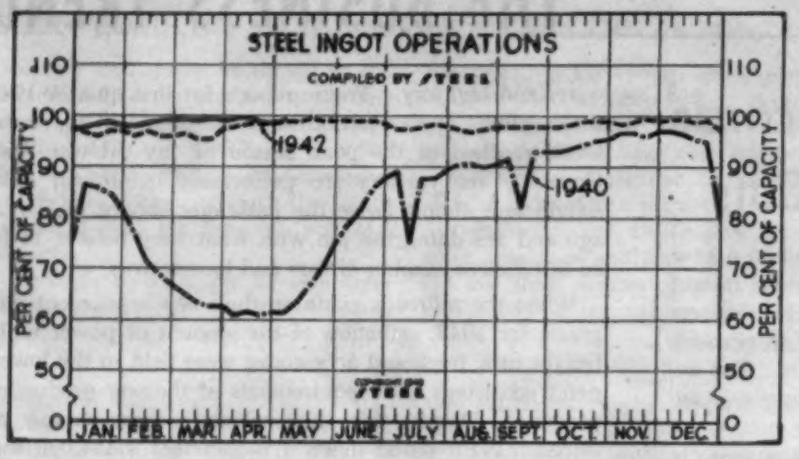
STEEL'S index of activity declined 0.8 point to 178.5 in the week ending May 1:

Week Ended	1943	1942
May 1	178.5†	167.4
April 24	179.3	166.4
April 17	178.6	166.7
April 10	178.8	166.2
April 3	178.5	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1
Mar. 6	178.2	164.8
Feb. 27	178.9	165.0
Feb. 20	179.8	165.1

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.3	48.8	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.5
March	179.0	164.6	135.9	104.1	92.6	71.2	114.4	87.7	88.1	78.9	44.5	54.2
April	.....	166.7	127.2	102.7	88.3	70.5	116.6	100.8	85.9	85.6	53.4	53.8
May	.....	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	85.7	66.5	54.8
June	.....	169.4	138.7	114.1	90.9	68.4	109.9	100.3	77.4	90.6	70.3	51.4
July	.....	171.0	136.7	108.4	89.5	66.2	110.4	100.1	75.3	85.7	77.1	47.1
Aug.	.....	173.5	116.1	101.1	83.9	68.7	110.0	97.1	76.7	83.0	74.1	48.0
Sept.	.....	174.8	126.4	113.5	96.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5
Oct.	.....	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	68.1	48.4
Nov.	.....	175.8	132.2	120.5	116.2	85.9	84.1	106.4	88.1	54.9	52.8	47.5
Dec.	.....	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.9	46.3

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production



Steel Ingot Operations

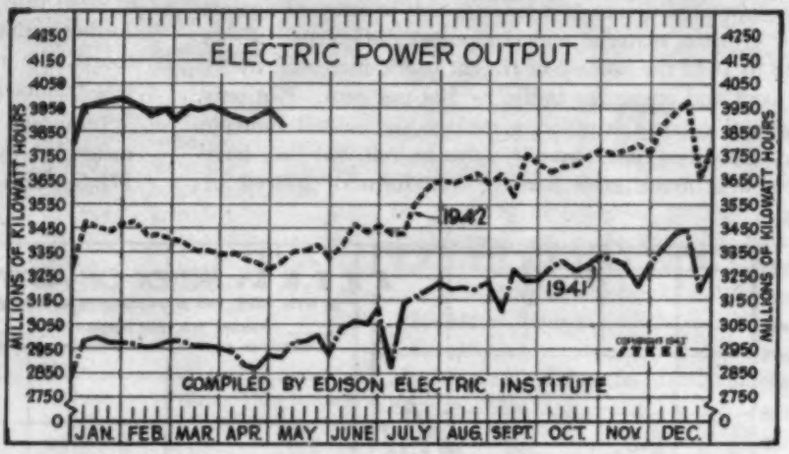
(Per Cent)

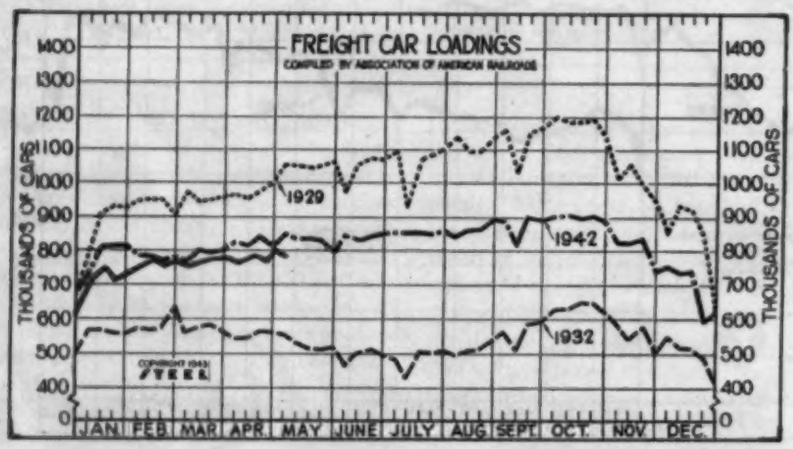
Week ended	1943	1942	1941	1940
May 1	99.5	99.0	95.0	63.5
April 24	99.0	98.5	96.0	61.5
April 17	99.0	98.5	98.0	61.5
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	63.5
Feb. 27	99.5	96.0	96.5	63.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	81.5
Jan. 16	99.0	96.0	94.5	84.5

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
May 1	3,867	3,305	2,734	2,386
April 24	3,925	3,273	2,750	2,398
April 17	3,917	3,308	2,702	2,422
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,480
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,893	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,969	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,525
Jan. 30	3,977	3,468	2,880	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,985	2,688


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
May 1	789†	859	794	665
April 24	794	816	722	644
April 17	781	847	709	628
April 10	789	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	769	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627
Jan. 30	735	816	714	657

†Preliminary.

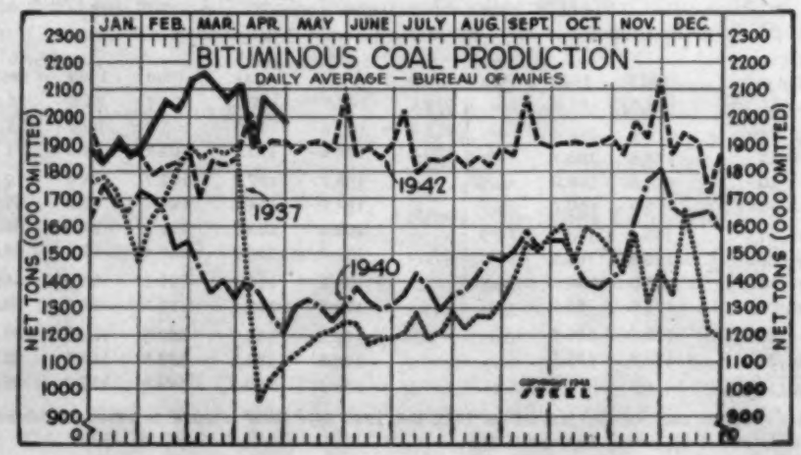
Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

Week ended	1943	1942	1941	1937
April 24	1,967†	1,916	267	1,092
April 17	2,017	1,919	233	1,041
April 10	2,067	1,875	200	953
April 3	1,858	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,118	1,878	1,736	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634
Jan. 30	1,900	1,866	1,684	1,466

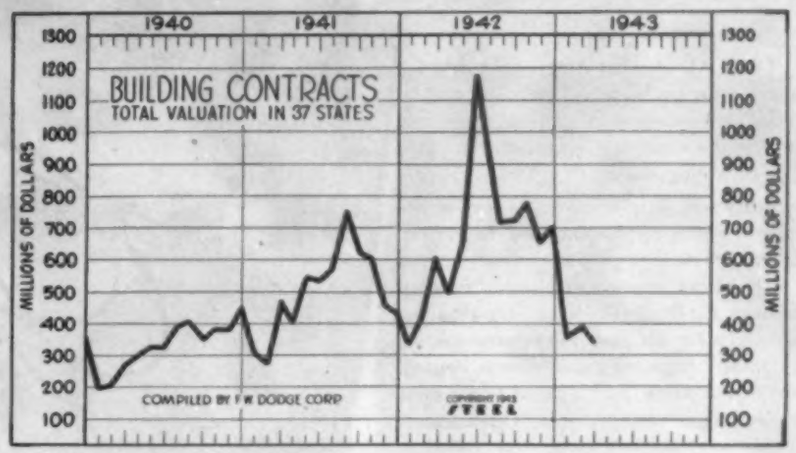
†Preliminary.

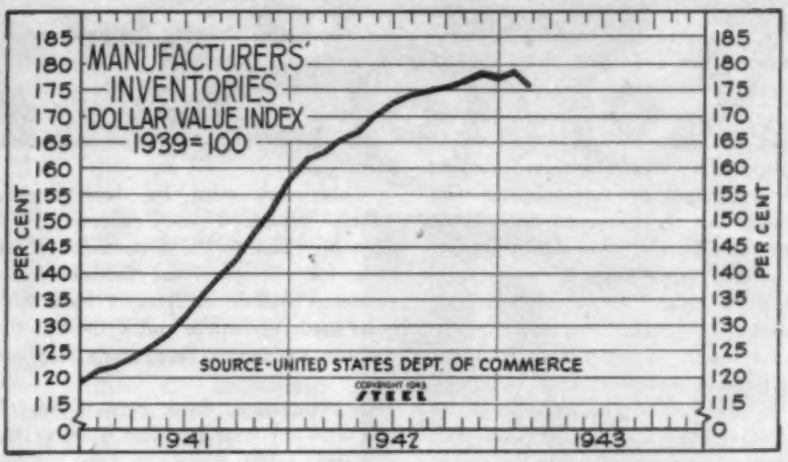

BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1943	1942	1941	1940	1939
Jan.	$350.6	$316.8	$305.2	$196.2	$251.7
Feb.	393.5	433.6	270.4	200.6	220.2
Mar.	339.7	610.8	479.9	272.2	300.7
April	.....	498.7	406.7	300.5	330.0
May	.....	673.5	548.7	328.9	308.5
June	.....	1190.3	539.1	324.7	288.3
July	.....	943.8	577.4	398.7	299.9
Aug.	.....	721.0	760.3	414.9	312.3
Sept.	.....	723.2	623.3	347.7	326.2
Oct.	.....	780.4	606.3	383.1	261.8
Nov.	.....	654.2	458.6	380.3	299.8
Dec.	.....	708.7	431.6	456.2	354.1
Ave.	.....	$687.9	$500.6	$333.7	$295.9





Manufacturers' Inventories Dollar Value Index

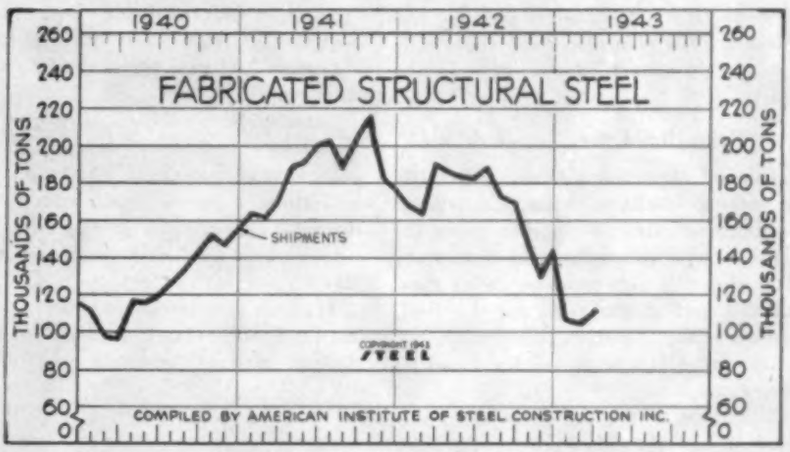
1939 = 100

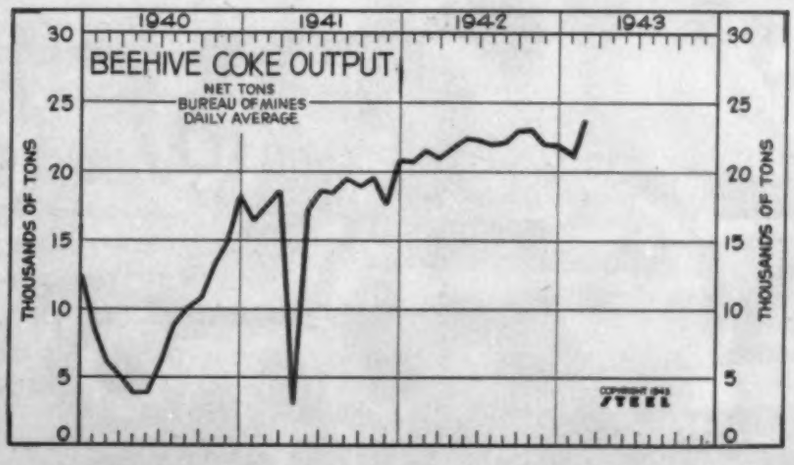
	1943	1942	1941	1940
Jan.	177.8	161.9	121.8	109.5
Feb.	175.7	163.0	122.7	110.6
March	.....	165.6	124.1	110.5
April	.....	167.0	126.0	110.0
May	.....	170.4	128.7	110.5
June	.....	172.9	132.0	110.6
July	.....	174.2	136.4	112.2
Aug.	.....	175.0	140.0	113.3
Sept.	.....	175.4	143.4	114.1
Oct.	.....	176.4	148.3	116.2
Nov.	.....	177.9	152.7	117.7
Dec.	.....	177.6	158.5	119.9
Mo. Ave.	.....	171.4	136.2	113.0

Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1943	1942	1941	1943	1942	1941
Jan.	106.6	167.8	164.6	58.6	183.4	281.2
Feb.	106.2	164.6	161.4	33.3	228.7	173.6
Mar.	111.6	191.3	170.2	37.1	248.3	206.1
Apr.	.....	187.2	189.8	.....	314.0	218.0
May	.....	184.2	191.9	.....	161.0	179.9
June	.....	182.7	200.5	.....	184.5	246.9
July	.....	189.9	203.0	.....	125.2	214.8
Aug.	.....	173.9	189.3	.....	80.6	158.7
Sept.	.....	169.8	204.1	.....	68.5	158.8
Oct.	.....	152.9	217.7	.....	50.9	128.7
Nov.	.....	130.4	182.6	.....	49.6	184.0
Dec.	.....	145.3	176.1	.....	67.6	146.4
Tot.	.....	2031.1	2251.1	.....	1755.8	2297.0





Beehive Coke Output

(Daily Average)

	1943	1942	1941	1940
Jan.	21,440	20,874	16,581	8,826
Feb.	23,991	21,771	17,729	6,212
March	.....	21,032	18,890	5,196
April	.....	21,843	3,100	3,928
May	.....	22,571	17,458	3,930
June	.....	22,487	18,803	6,036
July	.....	22,197	18,655	8,877
Aug.	.....	22,258	19,697	10,293
Sept.	.....	23,100	19,135	10,872
Oct.	.....	23,161	19,768	13,441
Nov.	.....	22,106	17,727	15,138
Dec.	.....	22,000	20,968	18,516
Average	.....	22,117	17,402	9,256

By GEORGE R. REISS

IT'S WAR WORK Or else!

TYPICAL of what American industries have done to keep in business and to retain a working force skilled in production is the case of General Fireproofing Co. of Youngstown.

For years, it was known as one of the most air-minded corporations in eastern Ohio.

All of its executives, from President George C. Brainard down, traveled extensively by air and were interested in aviation. Brainard's son, now a lieutenant in the Army, had learned to fly some years ago, fought at Guadalcanal. That, too, helped make the company air minded. The company also was making some aircraft parts such as aluminum chairs for planes, a natural development from its extensive business in making aluminum chairs for offices.

When the war came, aluminum supplies were curtailed, so the company switched to making chairs of steel. It already had a large business manufacturing steel office desks, files, cases, office shelving and other office equipment.

When the supply of steel was curtailed, company executives were already planning to get into war work. They negotiated some contracts with the Bell Aircraft Corp., Buffalo, and began building parts for Bell Airacobras. Now they flow in great quantities to Buffalo and Niagara Falls plants of Bell, where they are quickly assembled into fighting aircraft.

Helps Build the Thunderbolt

General Fireproofing is engaged chiefly in making fuselages, wing tips, tail assemblies, ailerons and other parts for the deadly P-39 airplane, known as the Airacobra. It also turns out wing flaps, ailerons and similar parts for the P-47, known as the Republic Thunderbolt, one of the latest fighter planes developed for the Army.

Employes of the big plant are proud of their war job. They post up the latest action photographs of Thunderbolts and Airacobras in washrooms and on workshop walls.

"Listen buddy," confided one worker, "We're helping build the world's best pursuit planes—and therefore we're helping win the war. Recently a squadron of flyers knocked down 33 German planes and lost only a single Airacobra—the planes must be good."

Just as with other companies, one of General Fireproofing's big problems was to find sufficient workers. Few workers of any type were available when the company went into the aircraft business. So G-F executives decided to train their own.

They sought to recruit workers throughout the city, and they flocked in, eager to help build war planes. In came barbers, waitresses, hospital workers and all kinds of non-factory workers—especially when women workers were encouraged by the company who felt there was no chance of them being lost to the "draft". Now about 35 per cent of the plant's force is female, and some departments are almost entirely "manned" by women workers.

The company opened a school and sent every new employe—and all old ones, too—to school to impress upon them the need for careful, accurate workmanship.

"That school," confided one executive, "has paid big dividends, both to the company and to the new workers. Building aircraft parts takes careful workmanship.

"Absolutely no sloppy work goes, for American boys' lives depend on the planes we're building. That training is preventing a lot of waste and it's immensely valuable in getting the new workers into production in a very short time."

Students are trained in drilling, riveting and other exacting work such as doping, pinking, patching and sewing . . . Graduates showing the most promise are made inspectors. The plant literally swarms with eagle-eyed inspectors who spot any inaccuracy in drilling a hole, in driving a rivet, or in aligning parts.

"This work must be done exactly right," explained an executive. "It must be exact to the thousandth of an inch, for our parts are assembled together at Buffalo or Niagara Falls with parts made elsewhere and if there is the slightest inaccurcy, these parts may not fit."

In Youngstown these days, if the fellow who cut your hair last week or the chap who sold you a steak at the butcher shop or the girl who served you in a retail shop isn't on duty, you probably will find him or her helping build airplanes at General Fireproofing. For butchers, five-and-dime clerks, grocery boys, dieticians, barbers, tailors, waitresses, stenographers, elevator operators and representatives of many other professions are now busy producing aircraft parts and subassemblies.

And that's how one fabricating plant is solving its war problem of staying in business and retaining its working force.

Directly above—Fuselage section partly assembled. Note heavy structural steel fixture for aligning parts properly during assembly operations

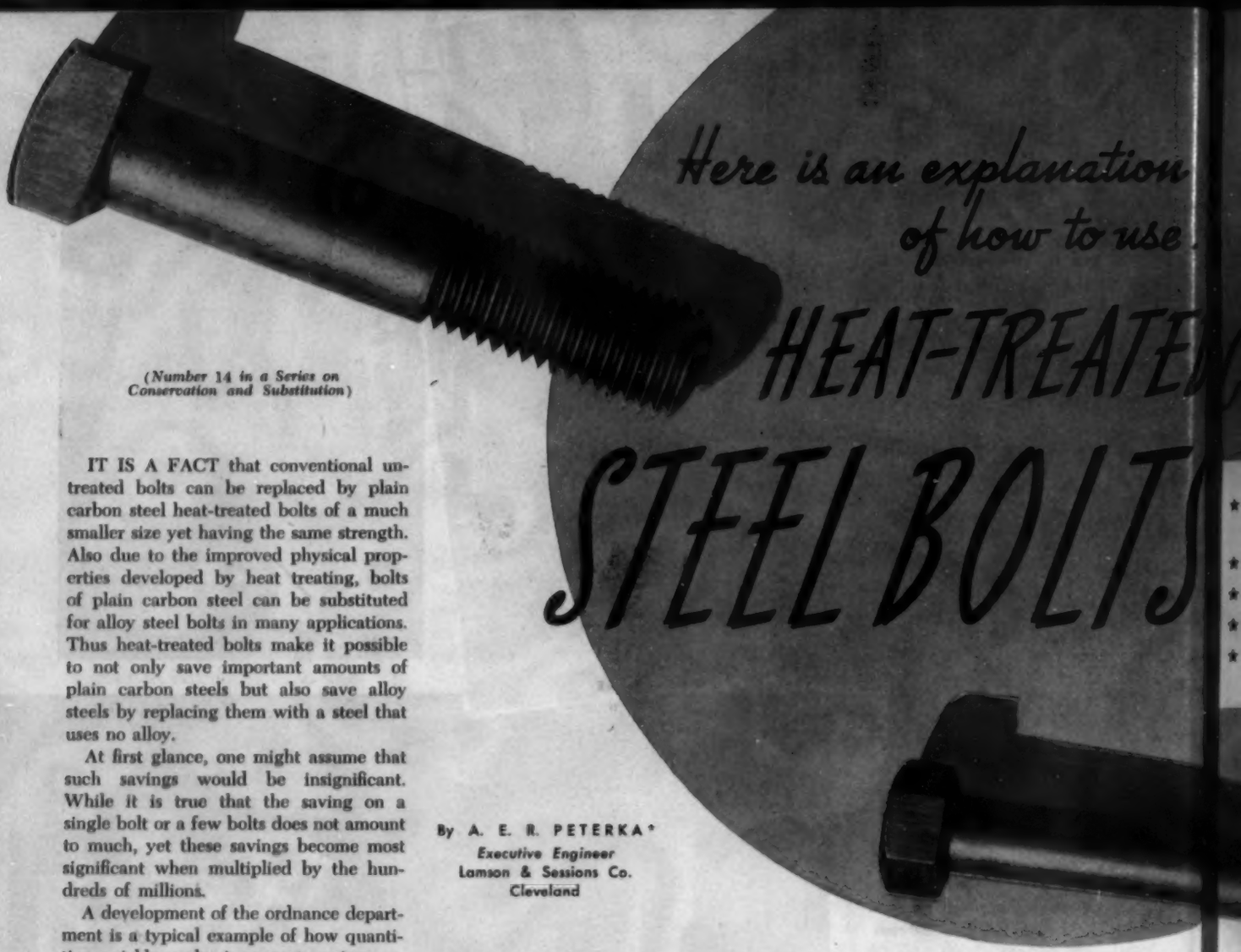
Right, above—Completed fuselage sections for Airacobras. Completed sections such as these go to Bell Aircraft Corp. plants at Buffalo and Niagara Falls for assembly into completed planes

Right—Wing tips being sprayed in specially ventilated paint booth

Opposite page—Girls do an expert job of sewing fabric covering on ailerons

Right, below—Former beauty shop operator and retail store employe assembling parts

Left, below—Girl operator working on partly assembled rudder section



Here is an explanation of how to use HEAT-TREATED STEEL BOLTS

(Number 14 in a Series on Conservation and Substitution)

By A. E. R. PETERKA*
Executive Engineer
Lamson & Sessions Co.
Cleveland

IT IS A FACT that conventional untreated bolts can be replaced by plain carbon steel heat-treated bolts of a much smaller size yet having the same strength. Also due to the improved physical properties developed by heat treating, bolts of plain carbon steel can be substituted for alloy steel bolts in many applications. Thus heat-treated bolts make it possible to not only save important amounts of plain carbon steels but also save alloy steels by replacing them with a steel that uses no alloy.

At first glance, one might assume that such savings would be insignificant. While it is true that the saving on a single bolt or a few bolts does not amount to much, yet these savings become most significant when multiplied by the hundreds of millions.

A development of the ordnance department is a typical example of how quantities quickly make important savings on small items. A primer tube originally made from brass is now stamped from steel sheets, "U'd" up to close, then sealed by brazing, eliminating entirely the need for brass. While this saving only amounts to 0.59-pound per unit, on a single order for 100,000,000 primers some 29,500 tons of brass are saved—and that's an important amount of a critical material. Savings in bolts can be equally important.

While savings in material are most vital in the present emergency, other important advantages are the cost reductions possible and the increase in the holding power of the bolted fastening.

Today more than ever it is most important that we use the smallest bolts that will carry the load safely. Adequate factors of safety must be allowed, of course, but they should be chosen with regard to actual physical properties of the bolts themselves rather than being based on more or less arbitrary data obtained from standard test specimens which have not been heat treated. Even though the data are based on results from tests of heat-treated steel, the values obtained will ordinarily be much lower than actual values because the test will be based on the standard 0.505-inch diameter test specimens rather than on bolts themselves which may be of much smaller diameter.

The reason why actual strength of bolts can be much higher than calculated or predicted strength is due to the phenomenon known as "mass effect." Take two bars of the same steel each a foot long but one ½-inch in diameter and the other 6 inches in diameter. The same heat treatment will produce a surface hardness of only about 250 brinell in the 6-inch bar compared to nearly 600 brinell in the ½-inch bar. The heavy bar fails to respond to its hardening treatment purely because of the difference in size, the larger bar having stored up much more heat than the smaller.

While the heat in both bars is dissipated rapidly upon quenching, the heavy bar has a much larger total heat content to be removed. This delays the drop in temperature just enough to slow down the quenching effect and thus prevent complete hardening of the heavy bar.

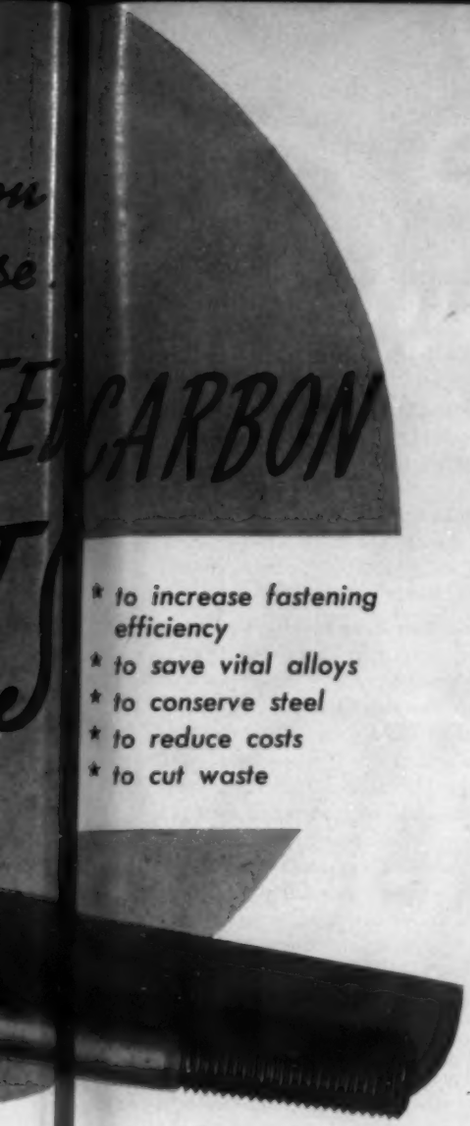
This effect not only prevents the interior of the large bar from being hardened but also cases the surfaces hardness to be decreased. Thus if a specification for shafting calls for steel heat treated to 300 brinell, plain carbon steel can meet the requirement only if the shaft thickness does not exceed about 3 inches, and even then this hardness will be attained only at the surface of the quenched and untempered bar.

There is a second factor to consider also. Optimum combinations of strength and toughness are best secured when the steel is fully hardened by the quench, followed by tempering to the desired strength level. If full hardness is not developed by the quench, the ductility and toughness after tempering may be high but the tensile strength low.

These factors operate to make many mechanical property charts misleading and to cause wide variations between calculated and actual physical properties on such items as bolts and cap screws.

Yet another factor enters into the ultimate strength attained when heat treating bolts. One reason why actual test values on bolts are much higher than predicted values is that the threads on a bolt act much like the fins on a cylinder of an air-cooled engine. Their effect in

*Now serving as chief of the Material Distribution Branch, Production Resources Section, Production Division, Army Air Forces' materiel center, Dayton, O., as Lieutenant Colonel in the Air Forces.



the quench is to promote rapid cooling at the very base of the root threads where the bolt diameter is a minimum and where strength is consequently most needed. The result is to promote yet more rapid cooling and thus increase the physical properties resulting from the heat treatment. This increase in speed of quenching (extraction of heat) is especially valuable because it increases the physical properties at the root of the threads—the most critical location.

Fig. 5 shows a chart giving results of three penetration hardness tests.

Fig. 4 shows how these penetration hardness tests are made. After the bar has been heat treated, it is sawed in two at the center and the surface prepared for hardness tests. These are taken across a diameter of the bar at about 1/16-inch intervals and the results plotted on a chart as shown in Fig. 5. The three curves in Fig. 5 represent hardness penetration tests taken on three different bar sizes, namely, ¾, 1⅛ and 1½ inches in diameter. The material in all three cases was 0.37 per cent carbon, 0.78 per cent manganese steel, quenched from 1500 degrees Fahr. into water at 75 to 90 degrees Fahr.

Note that the surface hardness of the ¾-inch diameter bar was 52 compared with 53 rockwell C for the 1½-inch bar—approximately the same. However, the minimum hardness at the center was 27 for the ¾-inch bar against 15 rockwell C for the 1½-inch bar. Thus the "mass effect" here has confined most of the hardness to the outer ¼-inch of the 1½-inch bar resulting in an interior section of this bar fully 1⅛ inches in diameter having a hardness of only 27 rockwell C or lower.

Compare this with the ¾-inch bar in which only a ¼-inch central section or about ⅛ of the total volume is less than 27 rockwell C or lower. Obviously the smaller bar will have a much higher average breaking strength per unit of cross sectional area than will the larger bar even though the smaller bar has been hardened to a slightly lower surface hardness.

While the effect shown here is between ¾ and 1½-inch diameter bars, the same thing would apply between ¾-inch and ¼-inch diameter bars but to a slightly less degree. This the so-called "mass effect" largely responsible for actual test results of heat-treated bolts being higher than calculated results. Also, as mentioned previously, the rapid cooling effected by the threads also helps to attain full hardness throughout the center of the work by speeding the extraction of heat during the quench.

Some idea of the actual ultimate strength of plain carbon steel bolts when they are heat treated properly can be obtained from the test results shown in Tables I and II. Table I is actual data on results of testing cap screws taken at random from the stock of the Lamson & Sessions Co. These were all 3 inches long, three samples in each of the four diameters—¾, ⅞, ½ and ⅝-inch—being tested.

Results in Table I show an ultimate strength varying from a low of 148,500 pounds per square inch to a high of 171,000 pounds per square inch. Note that hardness ranges from 269 to 341 brinell. These tests were made by Harry Churchill, engineering consultant, Cleveland.

Table II shows result of similar tests on SAE-1035 steel cap screws 3 inches long taken at random from Lamson & Sessions' stock and tested by James H. Herron Co., Cleveland. In this test four samples of each of the sizes from ¾ to ⅝-inch diameter were tested. Results show an ultimate strength ranging from a minimum of 147,100 pounds per square inch to a maximum of 172,700 pounds per square inch. Hardness tests on the head show hardness ranged from 285 to 332 brinell.

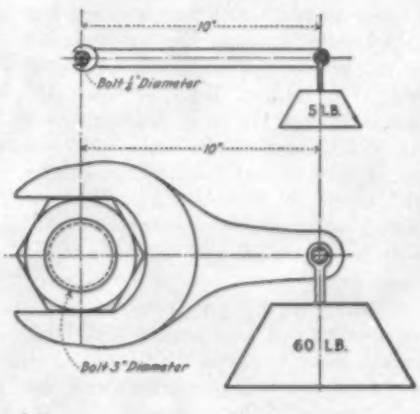
In all these tests the ultimate strength was based on the area calculated from the root diameter.

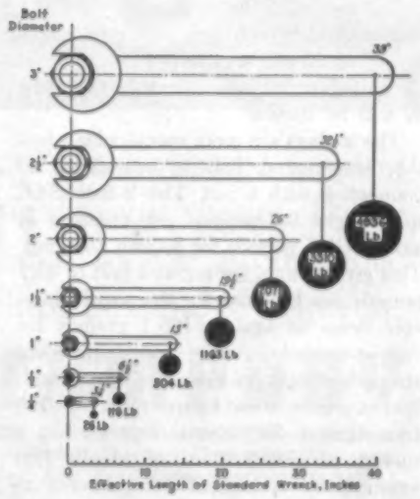
These tests show that it is not hard to attain ultimate strengths from 150,000 to 170,000 pounds per square inch in standard heat-treated carbon steel bolts and cap screws in sizes from ⅜ to ¾-inch diameter. This compares with 60,000 to 75,000 pounds per square inch which is taken as the ultimate strength of or-

Fig. 1. (Left, above)—"Believe it or not"—but these two bolts have the same ultimate strength. The ¾-inch bolt of ordinary steel has ultimate strength of about 24,000 pounds per square inch which compares with 160,000 for the ½-inch bolt made of SAE-1035 steel heat treated. The ½-inch bolt weighs only 40 per cent as much as the other

Fig. 2. (Upper right)—Diagrammatic presentation showing torque required to put pull or grip of 1000 pounds on bolts of different diameters. Note greater effectiveness of small bolt

Fig. 3. (Lower right)—Pictorial demonstration of pounds pull required on standard wrenches to produce a stress of 60,000 pounds per square inch in the bolt itself





dinary hot-rolled steel bolts and cap screws not heat treated. What these high physical strengths can mean in actual applications is graphically portrayed in the following example.

For instance, a ¾-inch bolt with 10 threads per inch made from ordinary hot-rolled steel of 0.14 to 0.22 per cent carbon content and not heat treated will be found to have a breaking strength of about 24,000 pounds. This is equivalent to about 75,000 pounds per square inch ultimate strength in the metal. As against this, a properly heat-treated, ½-inch diameter bolt with 20 threads per inch made from SAE-1035 steel and heat treated to an ultimate tensile strength of about 160,000 pounds per square inch has the *same* 24,000 pounds breaking strength. Thus a ½-inch heat-treated bolt can be used to replace a ¾-inch unheat-treated bolt since it has the same strength.

But here is the significant point—for the same length, the ½-inch bolt weighs about 40 per cent as much as the ¾-inch bolt. Thus the ½-inch bolt saves 60 per cent of the steel required by the ¾-inch bolt while doing the same job. Actually it will do a more effective job because it makes a more effective fastening as will be pointed out.

Heat Treating Saves Steel

A hundred ½-inch heat-treated bolts would weigh 35 pounds as against 86 pounds for a hundred of the ¾-inch bolts not heat treated—both 6 inches long. But bolts are made not by the hundreds but by the millions—so let's compare on the basis of a million. Here we have 430 tons as against 175 tons, showing a saving of 255 tons of steel merely by the use of heat-treated bolts of the smaller size. Obviously such savings can be extended widely wherever unheat-treated bolts are now used and there are many, many such applications.

Clearly you can save steel by calling for heat-treated cap screws and bolts. In the sample above, both steels cost about the same per pound and both rank about the same in availability but the heat-treated ½-inch bolt yields an actual saving of 60 per cent in steel in addition to providing a more effective fastening as will be shown.

The savings are more spectacular when the heat-treated bolt is considered in connection with a nut. The ½-inch SAE nut weighs 3.7 pounds per hundred as against 20.1 pounds for ¾-inch USS nut. This gives a total for nut and bolt of 38.7 pounds per hundred for the small diameter items as against 106.1 pounds for unheat-treated items of equivalent strength. Based on manufacturing a million at a time, these figures reduce to 190 tons against 530.5 tons, representing a saving of 340.5 tons of steel. This amounts to savings of 64 per cent in amount of critical material.

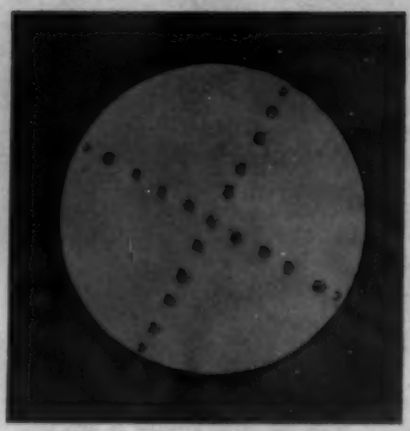
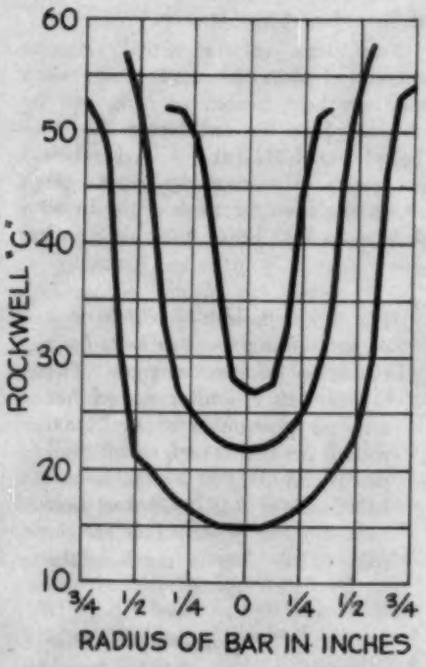


Fig. 4. (Above)—Hardness penetration curves in Fig. 1 were made by taking hardness readings across sections of the bar after heat treatment as shown here

Fig. 5. (Below)—Hardness penetration curves for three sizes of bar stock—¾, 1⅛ and 1½-inches diameter. All were quenched from 1500 degrees Fahr. into water. Material analyzed 0.37 per cent carbon; 0.78 per cent manganese. Note how large size bar has much greater proportion of metal unhardened, thus giving lower effective ultimate strength



Today when every possible means must be taken to conserve steel—and especially when it is realized that such heat-treated bolts can be used to replace alloy steel bolts in many applications—these important material savings cannot be overlooked. All aircraft and automotive engineers long ago took advantage of the savings accruing from use of heat-treated items. Other designers and engineers can profit accordingly.

For example, Army Air Corps specifications last year were changed to approve the use of SAE-4037 heat-treated steel as an alternate for SAE-2330, and NE-8630 for SAE-X-4130 when used for manufacture of nuts and bolts, all sizes and types where the shank diameter is ¾-inch and less. This elimination of nickel in these applications is an important conservation measure.

Likewise AMS-6322 (NE-8739) steel is considered satisfactory for bolts under as well as over ¾-inch in diameter.

Other substitutions already made include the use of NE-8739, NE-8630, for SAE-3135 and SAE-3140 for bolts, screws and engine mounting studs.

How You Can Save Steel: Upsetting of bolts, cap screws and many other products with head, flanges or other portions larger than the shanks is today realized as essential to avoid wasting metal which would be machined if the parts were made from bar stock. Upsetting such products in heading machines is done with practically no scrap, producing an important savings in metal as well as time. Many carbon steels, alloy steels and nonferrous alloys are readily upset, hot or cold. Dimensional accuracy and finish are not sacrificed, for the most exacting aircraft specifications are met in upset products.

Bolts and cap screws up to 0.40 per cent carbon can be upset cold with little difficulty. It is even possible to cold upset parts containing up to 0.60 per cent carbon. Above this carbon content it is usually necessary to upset while the work is hot. Where a still higher carbon content is desired, you usually can go to a low alloy steel or to one of the residual alloy steels (known as NE steels).

Better Fastening Obtained: It is interesting to see how the use of a smaller diameter bolt, heat treated to give the same tensile strength as a larger bolt, results in a better fastening being obtained.

In most cases the efficiency of a bolt depends upon the care used in tightening it. In deciding how a bolt should be tightened it is necessary to consider what the stresses on it will be. These may be divided into four different classes:

—A bolt holding a part which is locked by other means.

—A bolt holding a part held in place by the grip of the bolt only.

—A bolt with a compressible substance, such as a spring or a compressible packing, between the two surfaces it is holding together.

—Bolts subject to shear.

In the first and last classes it is necessary to tighten the bolts to such an extent that they will be held firmly in place and will not work loose. By far the larger number of bolts are used where they

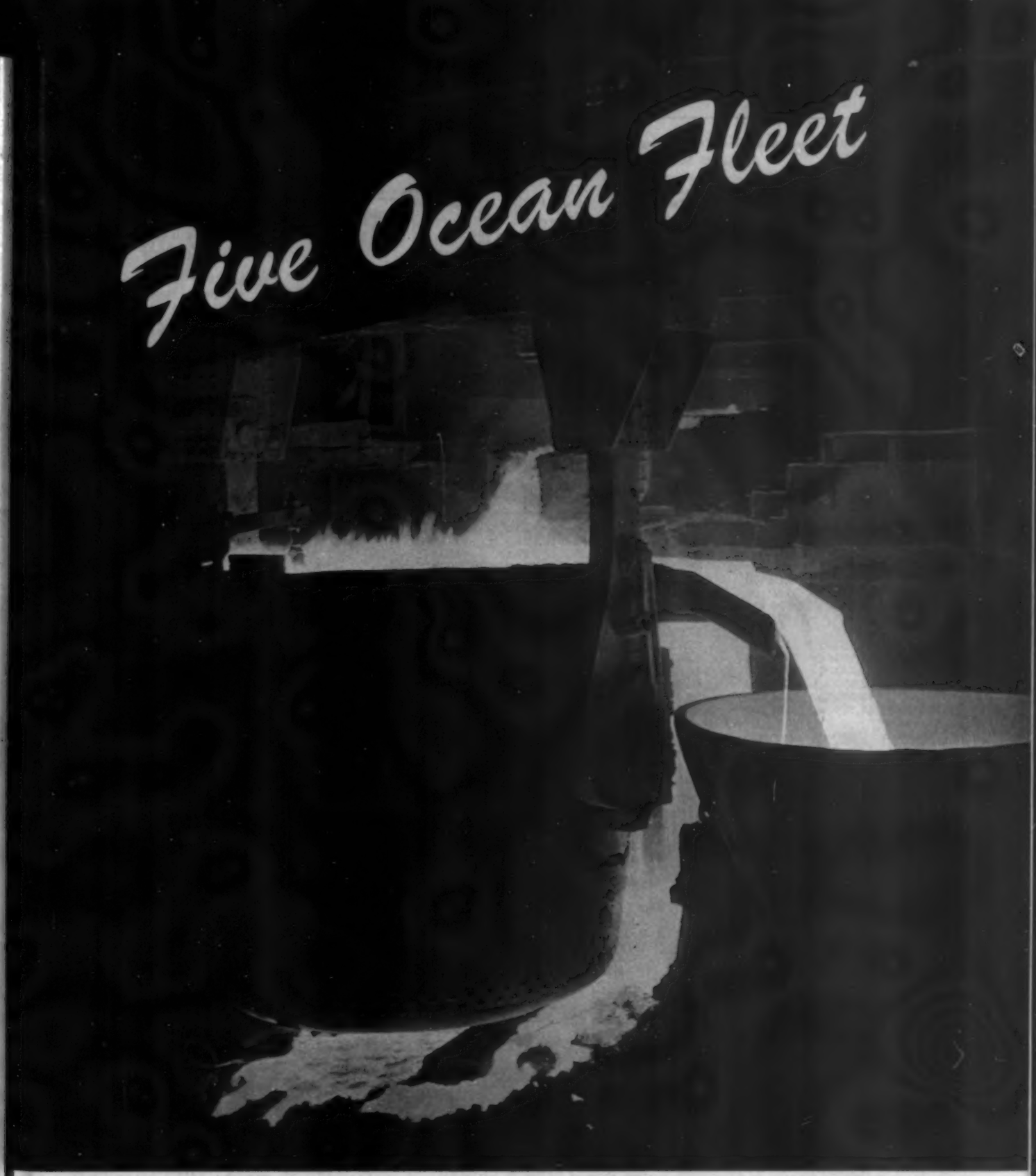


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TABLE I—Test of Heat-Treated Cap Screws by Harry Churchill
SAE-1035 Steel, 3-Inch Long

Nominal Size Inch	Breaking Strength, Pounds	Breaking Stress on Root Area, lb./in.2	Per Cent Reduction of Root Area	Brinell Hardness Number Head	Brinell Hardness Number End
¼	50,800	168,000	25.6	321	311
¼	49,000	162,000	31.4	321	302
¼	51,000	169,000	25.2	341	321
⅝	31,100	154,000	34.2	302	302
⅝	30,000	148,500	36.6	302	285
⅝	30,900	153,000	36.1	285	293
⅛	20,300	161,000	27.9	321	321
⅛	19,900	158,000	37.0	341	321
⅛	20,000	159,000	32.5	321	321
⅜	11,500	169,500	39.9	302	269
⅜	11,600	171,000	37.2	302	285
⅜	11,100	163,500	44.1	302	285

TABLE II—Test of Heat-Treated Cap Screws by James H. Herron Co.
SAE-1035 Steel, 3-Inch Long

Size	Yield Point Pounds	Yield Point Pounds Per Sq. In.	Ultimate Strength Pounds	Ultimate Strength Pounds Per Sq. In.	% Reduction	Brinell Hardness Point	Brinell Hardness Head
⅜-16	9,440	139,200	11,190	165,000	30.5	269*	311
⅜-16	9,410	138,800	11,100	163,700	35.0	269*	311
⅜-16	9,470	139,700	11,160	164,600	33.3	277*	311
⅜-16	9,280	136,900	11,040	162,800	37.6	269*	302
½-13	15,830	125,900	19,350	153,900	25.6	293*	302
½-13	15,000	119,300	18,490	147,100	26.9	269*	285
½-13	15,220	121,100	18,710	148,800	25.6	269*	285
½-13	15,540	123,600	19,180	152,600	27.4	269*	285
⅝-11	25,050	124,100	30,020	148,800	26.4	285	285
⅝-11	25,180	124,800	30,240	149,800	28.0	293	293
⅝-11	25,410	125,900	30,190	149,600	26.4	285	285
⅝-11	25,100	124,400	29,850	147,900	29.7	285	285
¾-10	42,390	140,400	49,620	164,300	24.1	321	321
¾-10	42,680	141,300	48,610	161,000	25.5	302	311
¾-10	43,550	144,200	50,020	165,700	24.1	321	321
¾-10	45,860	151,900	52,140	172,700	20.2	332	332

Remarks: Unit values computed on nominal root diameter.
*Readings are low due to inadequate surface area.

TABLE III
Data on Tightening Bolts, American National Coarse Thread System

Diameter of bolt, in.	Threads per inch	(See *) Inch-Pounds	(See †) Inch-Pounds	(See ‡) Inches	(See §) Pounds
¼	20	55	87	3.25	26
5/16	18	68	178	4.06	44
⅜	16	81	319	4.88	65
7/16	14	93	501	5.69	88
½	13	107	771	6.50	118
9/16	12	121	1,124	7.31	153
⅝	11	134	1,538	8.13	189
¾	10	160	2,730	9.75	280
⅞	9	186	4,371	11.4	383
1	8	212	6,534	13.0	504
1⅛	7	239	9,295	14.6	636
1¼	7	264	13,086	16.3	802
1⅜	6	315	22,686	19.5	1,163
1½	5	368	35,828	22.8	1,571
2	4½	420	53,961	26.0	2,075
2¼	4½	471	78,762	29.3	2,688
2½	4	523	107,589	32.5	3,310
2¾	4	573	145,761	35.8	4,071
3	3½	623	192,514	39.0	4,936

*Torque on nut for 1000 lb. tension in bolt.
†Torque on nut for 60,000 lb. per sq. in. stress in bolts.
‡Effective length of standard commercial wrenches.
§Pull on standard commercial wrenches to produce stress of 60,000 lb. per sq. in.

come under the second class. Here the efficiency of the bolt depends entirely upon the initial tightening.

Obviously the initial tightening stress is thus extremely important in many bolt applications. Therefore it is necessary to have some knowledge regarding the relation between the torque applied and the initial tension in the bolt.

A mathematical examination of the factors involved show that $Pl = 0.2DT$ of $T = 5Pl/D$ where P is the pull at the end of the wrench in pounds; l is the effective length of the wrench in inches; D is the nominal or outside diameter of the bolt in inches; T is the tensile stress in the bolt in pounds per square inch. Presented in another way, this means that with a constant torque the grip of the bolt or tension induced in its inversely proportional to the outside or nominal diameter of the bolt.

The importance of this relation is shown by reference to Figs 2 and 3. Fig. 2 shows the 60-pound pull which must be exerted at the end of a 10-inch wrench in order to produce a grip of 1000 pounds in a 3-inch bolt. Compare this with the 5-*pound pull* which will produce the same grip in a ¼-inch pull.

Fig. 3 shows the required pull on standard-length wrenches needed to produce stresses of 60,000 pounds per square inch in bolts of different diameters.

From these two diagrams, it is evident that it is easier for an operator to pull up a smaller bolt to its maximum effective tension than a large bolt. That this factor can be of great importance is brought out in Table III. The third column in this table shows torque which must be applied to the nut to develop a 1000-pound tension in the bolt.

Since the torque required to load a bolt at a given stress per square inch varies as the cube of the diameter of the bolt, standard wrenches produce a relatively high strain in bolts of small diameter and an extremely low one in bolts of large diameter.

Factors To Consider

It must be appreciated that the torque necessary to produce a grip or pull in a bolt varies directly as the diameter of the bolt. This is of importance, for it means that since the screw is used as a jack in forcing together the parts being joined, the smaller the diameter, the more efficient it will be. The conditions which must be considered in tightening bolts fall roughly into three classes:

In small sizes the danger of breaking the bolt is the principal one encountered. The torque necessary to break a ¼-inch bolt of 60,000 pounds per square inch ultimate strength is given in Table III as 87 inch-pounds. This requires little pull even when using a short wrench. Bolts ⅝-inch in diameter are about the smallest that are not readily broken with a standard wrench if the usual low-carbon steel is employed without heat treating.

In the medium group, from ⅝-inch to 1-inch or slightly larger, it is possible to apply a torque that will utilize the full strength of the bolt, but not with standard-length wrenches. (We are still talking about usual low-carbon steel "without heat treatment"). This is the reason why track bolts are usually tightened with longer wrenches, and why such wrenches are frequently used in car construction and other work. A study of Table III will indicate where extra long wrenches should be utilized.

Large bolts (over 1 inch in diameter) require so much torque to tighten them to a point where their strength is utilized efficiently that it would seem wise to

(*Please turn to Page* 135)

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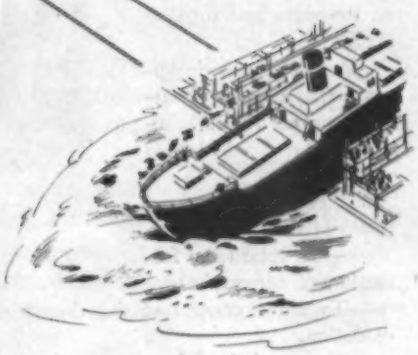

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Controlled Oxidation Firing

. . . . in automatic enameling furnace of unusual construction affords control over many hard-to-handle factors in production of enameled ware

Fig. 1—Load entering furnace from transfer car

FIRING porcelain enamel on steel by the controlled oxidation process may be described in brief as follows:

The ground coat is applied and dried in any suitable standard manner.

The ware is then allowed to heat up to between 1000 and 1100 degrees Fahr. in air, so that oxygen may penetrate the dry bisque and oxidize the surface of the iron base. The time and temperature of this operation may vary considerably depending upon the ware and furnace conditions.

After the oxidizing operation, the ware is heated to proper fusion in an atmosphere which is nonoxidizing.

In general the purposes of the process are:

—To retard the formation of copper heads.

—To allow control of the degree of oxidation.

—To retard the fishscaling tendencies. Most of the recent published work on the explanation of fishscaling agrees with results observed from time to time with this process.

—To retard formation of scale at the high temperature on areas of metal which are to be kept free from enamel.

The conditions of the process, as outlined above, can be met in the manufacture of large, closed, glass-lined tanks with a minimum of equipment, because the openings can be closed. Such tanks act as their own muffle and if properly ventilated can be successfully heated in a direct fired furnace. However, to meet the conditions when enameling light gage ware which cannot be closed to form its own muffle, the atmosphere in the entire furnace space must be controlled.

After considerable study, a furnace was designed having special features which were virtually dictated by the requirements of the process.

The furnace consists of two chambers built as one straight-through tunnel divided by an alloy door. Both chambers are heated by means of radiant tubes, using butane as the fuel. The tubes are fired alternately from either side, and extend across the bottom of the furnace and up the opposite side where they take a 180-degree turn downward for about 2 feet, and then pass out through the side wall of the furnace.

Each chamber of the furnace has a completely separated set of radiant tubes and controls. The air-gas ratio is maintained constant by use of a hydraulically operated regulating system. The hydraulic pressure is actuated by means of the differential pressure created by the flow of the gas and air through orifices in the respective pipe lines. The temperature of each chamber of the furnace is controlled by a throttling type recording-controlling potentiometer.

The ware is transported through the furnace by an alloy roller hearth and standard roller tables are used outside of the furnace.

The schematic drawing shows the general arrangement in elevation, and the plan view shows the complete conveyor system. The furnace chambers are each approximately 18 feet long, and the furnace loading was laid out for the use of an alloy tray 4 feet 2 inches wide and 14 feet long. There is room for six trays if all positions on the conveyor and in the furnace are filled, but in practice only five trays are used, so that there may always be room for one or more trays to advance.

The hearth rolls are made of centrifugal cast alloy cylinders having a tapered casting welded to each end. The tapered castings are lathe-turned at the ends so as to form short shafts. The tapered section of the rolls extend on out into the bearings which are fastened to the steel framework of the furnace shell.

In order to avoid the necessity of attempting to stop air leaks at each hole where the shafts come through, the de-

By W. G. MARTIN
A. O. Smith Corp.
Milwaukee

From a paper presented at the sixth annual forum of the Porcelain Enamel Institute.

Mr. Gordon, You've Got Something There!

And the curious thing is that he had!

That incredible bandwagon is actually the missing link between the Iron Horse and a dray horse. It combined the best features of a locomotive — steam — and a quadruped — *legs!*

For a horse's legs, brother Gordon reasoned with stirring logic, had always been the extremity of efficient hauling power, hence they always would be. So he built *mechanical* legs for his dream of motive power.... The spirited vehicle pranced itself to pieces, and Gordon's dream was ended.

Yet, in 1824, David Gordon had something that might have made mechanical history. It was *traction* that he was striving for, never dreaming that the wheels alone would give enough of it to pull his steam-driven carriage . . . while the regrettable legs on that hybrid hack were remarkably close in principle to the caterpillar-type of traction used today on tanks and tractors!

This story has a modern moral. For every engine and every machine that runs today represents many failures, many successes — and many problems that are still in the process of being solved. And in the solutions of those problems lie the great discoveries of the future!

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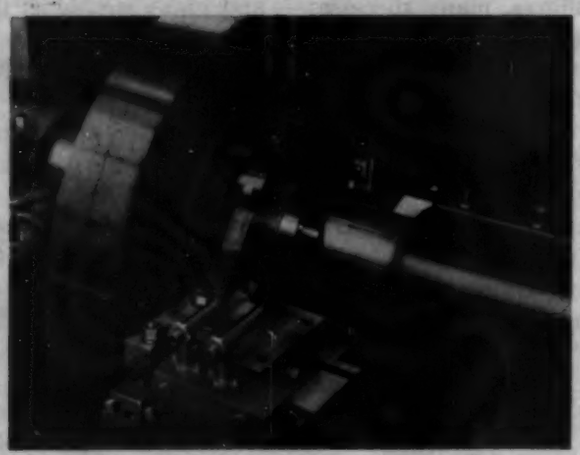

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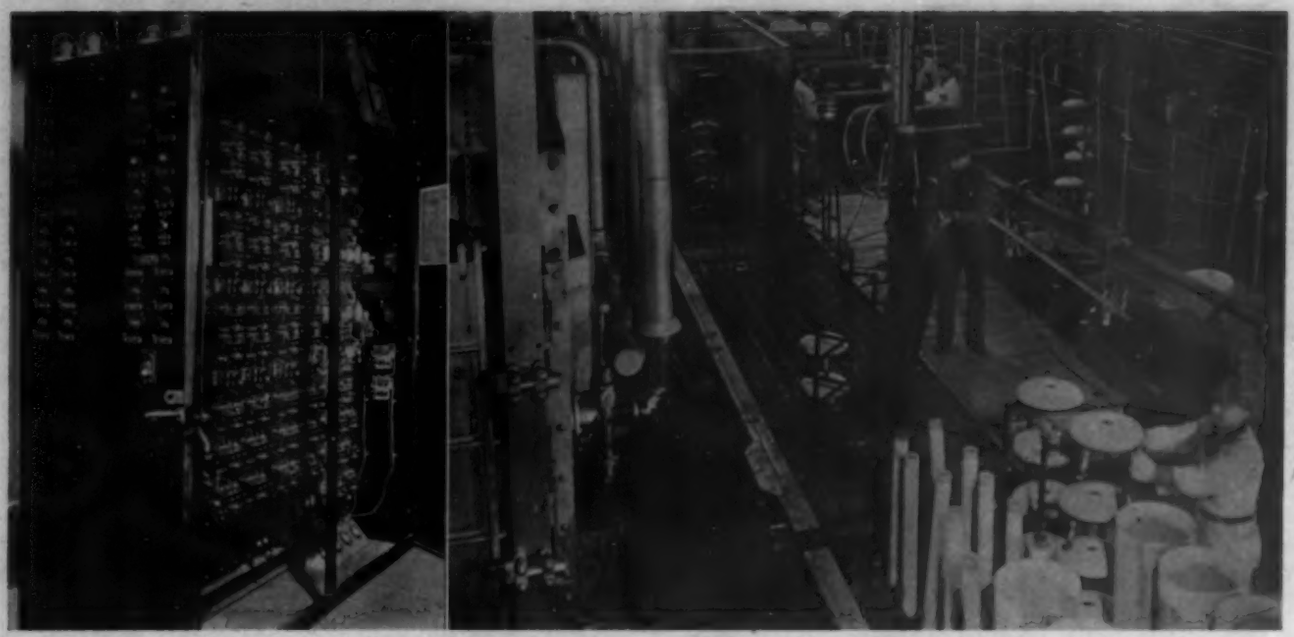


Fig. 2. (Left, above)—Automatic control panel. Note pushbuttons on end for controlling operations by hand when desired

Fig. 3. (Right)—Loading-unloading station alongside furnace

sign was so made that the complete bank of bearings for each chamber could be covered by steel plates bolted on from the outside.

The interior of the furnace is constructed of one course of firebrick backed up by a 4½-inch thickness of insulating brick and 4½ inches of insulating blocks. The top of the furnace chamber is of the arch type with generous provision for expansion of the refractories.

The bottom of the furnace is carried several inches off the foundation floor by means of steel channels. Steel plate, welded throughout, completely encases the furnace as a further precaution against air leaking into the hot zone. This construction also has some general insulating value.

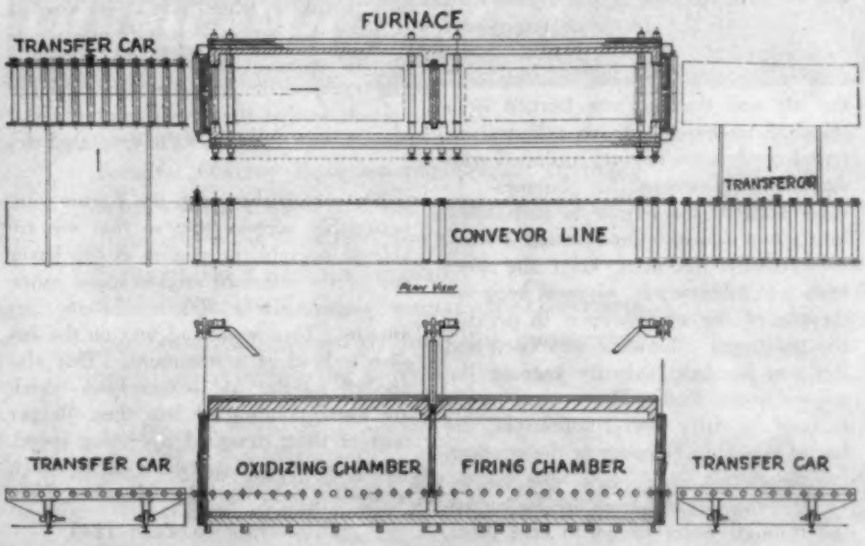
The simplest conception of the operation may be had by thinking of one tray only going through the system. In this case the tray is on the No. 1 transfer car, in which position it is loaded with the coated ware. When the operator presses the starting button the transfer car moves on its track to a new position directly in front of the No. 1 furnace door. While the transfer car is moving, the No. 1 door is also rising, and when it has reached the top limit switch, the rolls of the No. 1 transfer car begin to turn and advance the loaded tray into the first furnace chamber, the roller hearth of which is also turning. The advance of the loaded tray continues until it reaches the far end of the first furnace chamber where a flag on the tray intercepts an electric eye light beam and the rolls stop their rotation. The electric impulse set up by the electric eye also actuates relays to close the No. 1 door and move the No. 1 transfer car back to the loading position. All this time the center door remains closed.

Trays on the conveyor are automatically advanced as soon as the No. 1 transfer car comes back to the loading position. The same electric eye impulse also starts a slow reversed motion of the hearth rolls which continue until the loaded tray has moved back toward the door for a distance of approximately 18 inches. At this time the load intercepts another electric eye beam which causes the roller hearth to travel forward again, but at a slow speed. This oscillation of the load continues in the furnace until the oxidation time is completed.

If the rolls were to stop completely when the load comes into the furnace, the top portion of the rolls would be considerably cooled by radiation to the enamel ware and alloy tray, while at the same time the lower part of the rolls would be receiving heat rapidly from the radiant tubes which would be firing at their maximum rate during the early part of the heating period. By providing for the slow rotation of the rolls, uneven heating is avoided, and it is felt that this provision greatly reduces the thermal wear and tear on the alloy metal of these centrifugally cast rolls.

The No. 1 electric timer having indicated completion of the oxidizing period, relays cause the center door of the furnace to rise. When this door reaches its top limit switch, the roller hearth of both chambers begins to rotate rapidly

Fig. 4—Plan and elevation diagrams of furnace for oxidation enameling process



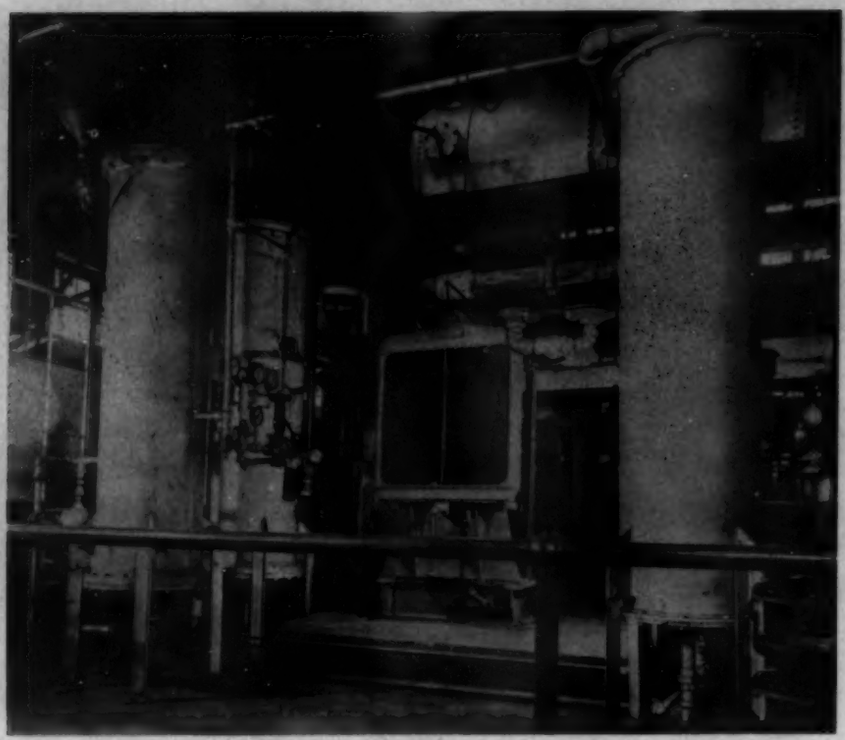


Fig. 5—Controlled atmosphere equipment

in a forward direction and the loaded tray advances into the hot zone of the furnace. Here again when the load reaches the far end and intercepts an electric eye beam the door begins to close and the roller hearth stops and reverses direction of rotation at slow speed. When the center No. 2 door reaches the closed position, a limit switch is operated which starts the purging gas to flow into this chamber at a high rate, which is continued for about one minute when an electric timer shuts off the high rate flow and the slow or maintenance rate of gas flow continues into the hot zone chamber.

When the hot zone firing time has elapsed, the electric timer starts the opening of the No. 3 furnace door and also puts in motion the No. 2 transfer car so that by the time the door is open the transfer car is in position ready to receive the load of ware which is discharged from the furnace by the forward rotation of the roller hearth and the roller table on the No. 2 transfer car. As soon as the load has fully advanced onto the transfer car, the No. 3 door begins to close and the car moves back to its normal position.

When the furnace operator presses the starting button, the ensuing detail operations are timed, controlled, and repeated by the arrangement of timers, electric eyes, limit switches and interlocking relays. By the proper functioning of these parts, it is possible to have ware in both chambers of the furnace practically all of the time.

The furnace was designed for a gross load of 10,000 pounds per hour, and a tool-to-ware ratio of 1 to 2. The fuel consumption is approximately 55 gallons of butane per hour under full-load conditions.

Maintaining a satisfactory atmosphere in the hot zone of this furnace presented some new problems. When any one of the three doors is opened, the temperature differential causes a rapid insweep of air into the furnace and therefore the equipment is arranged so that the prepared atmosphere can be run into the furnace at a high rate until this original free oxygen is eliminated. Then the rate of atmosphere supply is cut down to a level just sufficient to maintain the proper fusing zone atmosphere.

Making the necessary atmosphere is essentially a problem of burning air with a rich mixture of the most convenient fuel available. Butane is quite satisfactory for this purpose. In this case the air and the fuel are burned in a standard industrial type six-cylinder, internal combustion engine, equipped with standard carburetors for butane. In some respects the engine is performing as a pump and in order to make it work satisfactorily we must keep the lines open. In other words, we must keep the throttle of the engine open to provide the maximum volumetric efficiency and this can be done only by keeping the engine under load. The engine power is used to drive two compressors, the use of which will appear in the continuing description.

The exhaust gases from the engine are led through water sprays to cool them, and then they flow on through a diaphragm valve to the first compressor. This compressor builds up and maintains a pressure of 125 pounds per square inch in a second water spray chamber from which the gases are bled off through another diaphragm valve into a standard receiver tank. By cooling the gases to 70 degrees Fahr. under a pressure of 125 pounds per square inch, moisture is removed to the same degree as though the gases were cooled to 14 degrees Fahr. at ordinary atmospheric pressure.

Supplies Shop Air Line

The exhaust gases do not enter the second compressor. This machine simply takes about one half of the power that must be used and furnishes compressed air which is led into the regular shop air line at a very low cost.

Atmosphere is flowing at a low rate through an adjustable valve into the hot zone of the furnace all of the time during working hours. When a load of ware enters the hot zone and the center door comes down, an electric relay opens a second valve so that the gas flows into the hot zone at a purging rate for about a minute, at the end of which time this second valve is closed by an electric timer.

Thus through the use of an engine and compressors, and storing the atmosphere under pressure, it is quite easy to meet the requirements of supplying the atmosphere at two different rates. The gases are generated at about 175 cubic feet per minute. The purge is at the rate of 450 cubic feet per minute and the maintenance rate is 140 cubic feet per minute. Since the maintenance rate is lower than the rate of generation, an excess of gas is built up in the receiver by the time the next purge is required.

At the time of the design and purchase of the furnace and atmosphere generating equipment, it was not possible to calculate accurately the amount of atmosphere which would be needed to keep the hot zone free from uncombined oxygen. Therefore the engines and compressors were purchased large enough so that they could supply about 50 per cent more than the estimated demand.

Fortunately, however, the figures were reasonably conservative so that we are able to operate the engine at the lower end of the standard engine speed range or approximately 900 revolutions per minute. Thus wear and tear on the engine is held at a minimum. This also applies to the air compressors which are also operating at less than 75 per cent of their designed operating speed. The number two, or center door, which separates the oxidizing chamber from

(*Please turn to Page* 124)

Extra protection for workers. This section of Steel Interlocked Hose sucks abrasive dust from grinding wheels ... a "safety" application of American Flexible Metal Hose that affords protection for employees and thereby helps cut absenteeism and lost time.

Constantly soaked in grease. Five lengths of Flexible Interlocked Steel Tubing convey cartridge cups into pans as they are punched out by this blanking machine. Entire operation is bathed in lubricant and grease—but it can't rot or damage this all-metal construction in the least. Can be bent to any position to act as a "chute".

Flexible Oil Feed and Coolant Tubing is a special product of American Metal Hose for machine tool applications. Furnished in any length as required, this flexible metal tubing easily bends to any desired position, and *stays put* when bent.

Metal Hose on the War Job—

GRINDER DUST, CARTRIDGE CUPS, LUBRICATING OIL

Using virtually any workable metal, we can furnish flexible hose or tubing for anything from a simple spout to a high pressure hydraulic line (*American Seamless*) that can be flexed millions of times without breaking.

If you need a flexible connector for conveying air, water, oil, steam or fuel—for connecting misaligned or moving parts, or isolating vibration—chances are we have a type of hose or tubing that will do the job better. Complete descriptive literature available on request. 48199

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General Offices: Waterbury, Connecticut
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In Canada: Anaconda American Brass Ltd., *New Toronto, Ontario*

ANACONDA *American Metal Hose*

Metal Spraying

. . . . now extended to all flat and irregular surfaces

By C. K. WILSON
Development Engineer
Metallizing Engineering Co. Inc.
Long Island City, N. Y.

FOR YEARS, there has been a consistent trend to metal spraying as a means of corrosion proofing, hard surfacing or salvaging worn, or mis-machined parts. Now, when the need for material conservation is so crucial, the method is more valuable than ever. Thus the extension of the process to include flat and irregular surfaces is a significant development.

The most important step in the process is proper preparation of the surface to which new metal is to be applied. This is so because the strength of the attachment is a direct function of the quality and quantity of the mechanical keys between the two elements since no appreciable fusion between the sprayed metal and the base takes place.

The two traditional methods of surface preparation are grit blasting and special machining. Many different machining methods have been used, the most successful of which has been grooving in combination with a special rotary tool which can be made to produce a bond as strong as the sprayed metal itself. Obviously these methods of surface preparation can be applied only to readily accessible, machinable surfaces. Since lathes provide ready means for handling these machining operations, for a long time most parts that were metal sprayed have been more or less limited to those of a cylindrical shape. The new method of surface preparation entirely eliminates these restrictions.

In the case of grit blasting, the hardness of the surface is a critical factor in the quality of the keying effect which can be obtained. With modern tool materials the range of surfaces which can be prepared by machining has been greatly increased, but is still strictly limited to those parts which can readily be set up for machining, of such contour that all areas to be prepared can be reached by the necessary tools, and of a hardness not exceeding 58 rockwell C, and preferably below 50.

A new method of surface preparation is independent of surface hardness and by nature easily applicable to the most inaccessible surfaces. This process has been called "Fuse-Bond." On practically any metal surface, regardless of its hardness, size or shape, it will produce a bond equal to or better than that afforded by the most efficiently rough-threaded or blasted surface, it has been found.

The new process differs radically from all previous methods in that the bonding surface is prepared electrically. By means of electrical resistance heating of a minute area of the surface, a partical of a special electrode alloy is fused to the surface being prepared. The power unit used has unusual current and voltage characteristics. Combined with the peculiar properties of the special electrode metal and the high instantaneous temperature produced, the result is to cause the electrode material to gas violently as it is fused to the base. This produces a spot of *metal froth* which has the appearance of frozen soap suds on solidifying.

The electrode material is supplied in the form of small diameter rods, a number of which are traversed over the surface together. As the electrode surface comes in contact with the base metals, it leaves the rod and thus breaks the heating circuit. This cycle of contact, fusion, explosion and parting of the particle of molten electrode metal from the rod recurs repeatedly as the electrode moves over the surface.

As this same operation is performed with a group of electrodes clamped together in line, it can be seen that a number of strings of metal froth will be deposited. In practice, the technique is to move the group of electrodes sidewise in a rocking motion as they are traversed. The net result is a more or less random distribution of the bonding froth over the base material.

Fig. 1—Preparing surface for metal spraying using the Fuse-Bond process. Electrode has six small rods which deposit a metal "froth" welded to the base material. See Fig. 2

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FOR VICTORY
BUY UNITED STATES WAR BONDS AND STAMPS

Fig. 2 shows a section of a steel plate which has been prepared by the new process and then metal sprayed with carbon steel. Since the magnification in this photomicrograph is 100 times, it gives the appearance of a solid layer of electrode material adhered to the base. This, however, is not the case. An inspection of a surface prepared by this process shows that actually only a small proportion of the surface of the base piece has been affected by the operation. This proportion can be made as small as may be desired depending on the bond strength required. It probably never exceeds 50 per cent of the surface, possibly averaging 25 to 35 per cent. As is apparent in Fig. 2, the penetration of the electrode metal into the base material is very slight, and there is no evidence of any change in the grain structure of the base below 0.003 to 0.005-inch.

A consideration of these two points will answer the question as to its effect on the strength of the base metal.

Among other methods of resurfacing worn parts, welding has been widely used. But excessive heating and consequent extensive alteration of the strength properties of the base metal cause difficulty.

Metal spraying is thus often preferred because it is essentially a "cool" process. Any required thickness of coating can be sprayed without raising the temperature of the base above a temperature comfortable to the hand. In the past, however, it has always been difficult to obtain high bond strength between the base and the sprayed coating unless the base was readily machinable on a lathe and then only when the part being worked had adequate strength even after multiple grooves about 0.025-inch deep had been machined in its surface.

Grit blasting, on the other hand, has the inherent limitations of low bond strength on hard materials and very frequently is impractical because of the equipment involved, the possibilities of damage to surrounding parts and bearings from the abrasive dust.

The new process overcomes these limitations and disadvantages. The equipment is small and portable. It can be operated from either 110 or 220-volt 60-cycle power which is almost universally available. It produces no smoke, fumes or dust. The little spatter can be controlled easily. Any alterations in the surface of the base are confined to a depth which does not exceed 0.005-inch and on the average is considerably less. Moreover, even this effect on the surface is random in distribution and occurs on only a small proportion of the surface. The instantaneous temperature produced at the point of contact between the electrode and the work is not nearly as high as that obtained in welding and by the very nature of the process these temperatures obtain for only extremely short periods at any one point. This can be demonstrated by preparing one side of a sheet of ⅛-inch thick steel by the Fuse-Bond process while the bare hand is held against the other side.

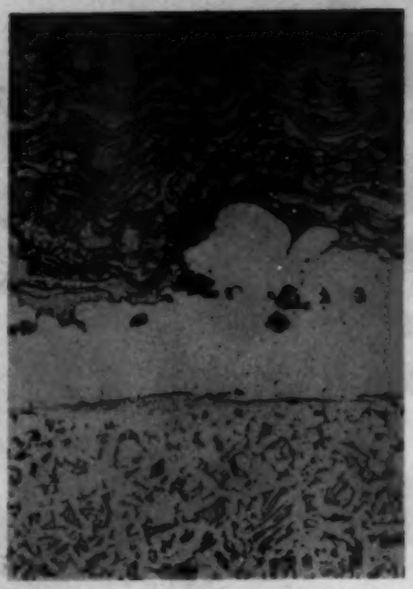


Fig. 2—Dark material at top is sprayed metal. Next is layer of "Fuse-Bond" metal. Below is base material. Shown at 100 *diameters*

One secondary cable is connected to an electrode holder arranged to accommodate six electrodes. For stationary work, the other secondary cable is clamped solidly to the work piece. A contact brush mounted to set up in the tool post of a lathe is also provided. By using this brush, work can be prepared while being rotated. Fig. 1 shows a crank shaft being prepared for metal spraying using this setup.

The power unit, rated at 2.5 killovolt amperes, was designed especially for this process. Its current—voltage characteristics contribute to obtaining the frothy deposit required. The maximum secondary potential of only 9 volts obviates any shock hazard.

New Glass Thermometers Are More Legible

An entirely new thermometer incorporating every new improvement heretofore added to existing glass thermometers, plus new improvements, is announced by American Schaeffer & Budenberg Instrument Division, Manning, Maxwell & Moore Inc., Bridgeport, Conn.

Originally designed as a means of conserving critical copper used in cast bronze cases, it has grown into an advancement in the manufacture of industrial thermometers.

Some of the features are: The thermometer is made so it is possible to furnish back, side, and oblique angles without using the ball joint; scales and tubes are located in a manner which produces greatest readability; a more legible and better looking scale than has ever been available before. Another important factor of the glass thermometer is the fact that the weight is approximately 1/3 less than the present standard glass thermometer of same size.

Practice Recommendation On Wire Rope in Print

Printed copies of simplified practice recommendation R198-43, "Wire Rope," are now available, the Division of Simplified Practice, National Bureau of Standards, Washington, reported recently.

This recommendation, which was promulgated in February, was developed by engineers of the rope industry to serve as a wartime conservation measure and as a guide for postwar practice. It passed through the regular procedure of the National Bureau of Standards, at the request of the War Production Board.

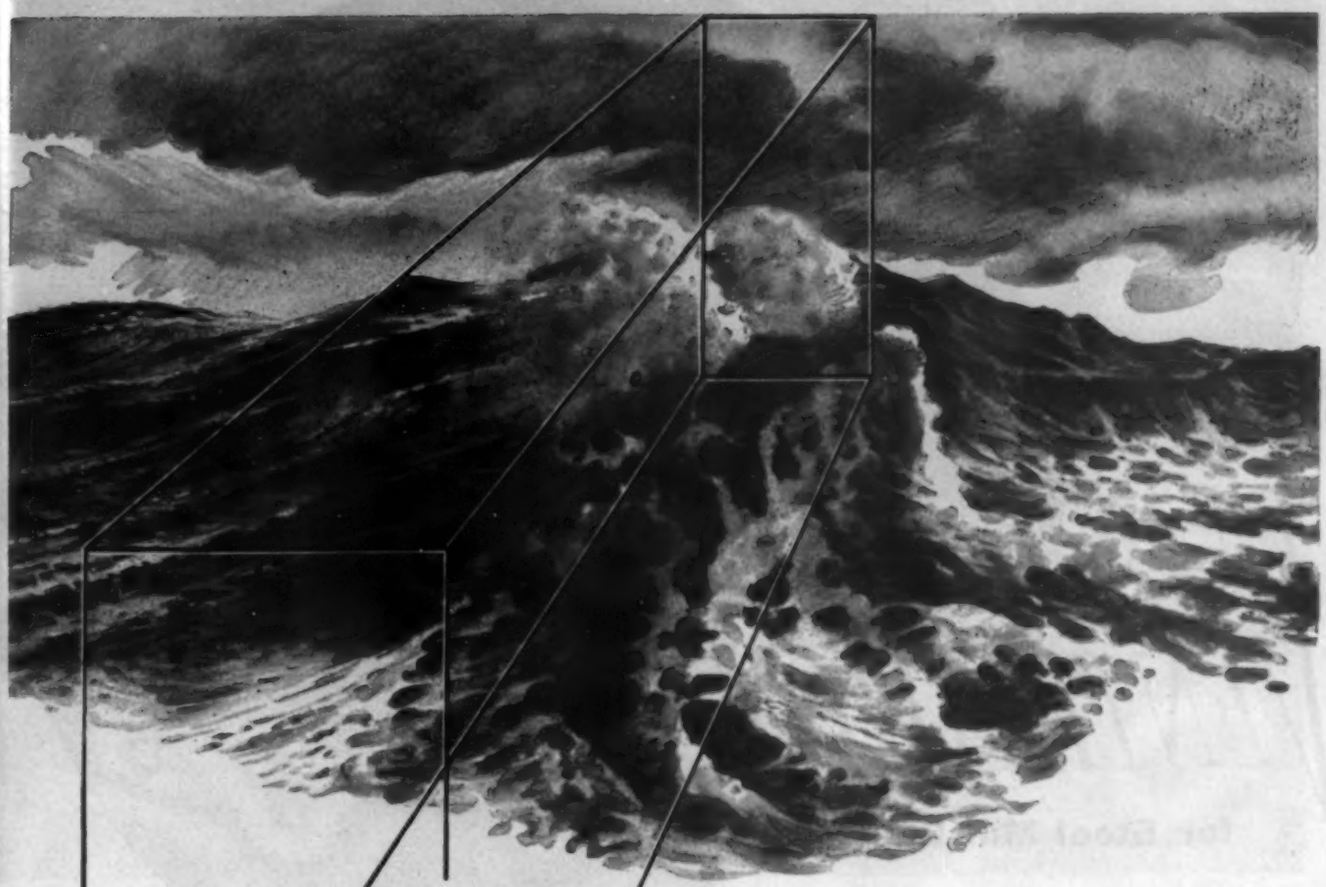
General adherence to the recommendation will result in a net reduction in variety from 973 to 643, or 33.9 per cent. The major production and use of wire rope and, therefore the predominant tonnage, is covered by four different constructions, where the reduction in variety will be from 352 to 182, or 48 per cent.

The publication contains, in addition to the simplified list, a brief history of the development of wire rope and a list of the firms, organizations and governmental establishments that accepted the program. It may be obtained from the

Power Plant Dividends Discussed in Booklet

"Dividends from Your Power Plant" is the title of a 48-page booklet being distributed by Preferred Utilities Co. Inc., 33 West Sixtieth street, New York, written for executives without extensive engineering training in order to "put across" principles governing the economical operation of steam-generating equipment.

The booklet discusses subjects such as: dollars and cents importance of boiler efficiency, relation between steam costs and profits, natural versus mechanical draft, carbon dioxide and carbon monoxide, excess air; and factors that govern labor costs in the boiler room. The text is pointed up with examples, tables and sketches to make each topic clear.



THE BRICK THAT SAVED A THOUSAND SHIPS

Dehydrated food saves shipping space.
Compressed dehydrated food briquettes
Save still more space.
Thus, one supply ship can now carry
The food equivalent of ten supply ships . . .
And each ship can provision ten times
As many soldiers as ever before.
Air conditioning and refrigeration equipment
Makes possible these dehydrated food bricks . . .
Dependable and efficient cooling equipment
Provided by General Electric. After the war,
When air conditioning and refrigeration
Will again become available to the public,
Take advantage of G-E experience
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Commercial and industrial refrigeration . . .
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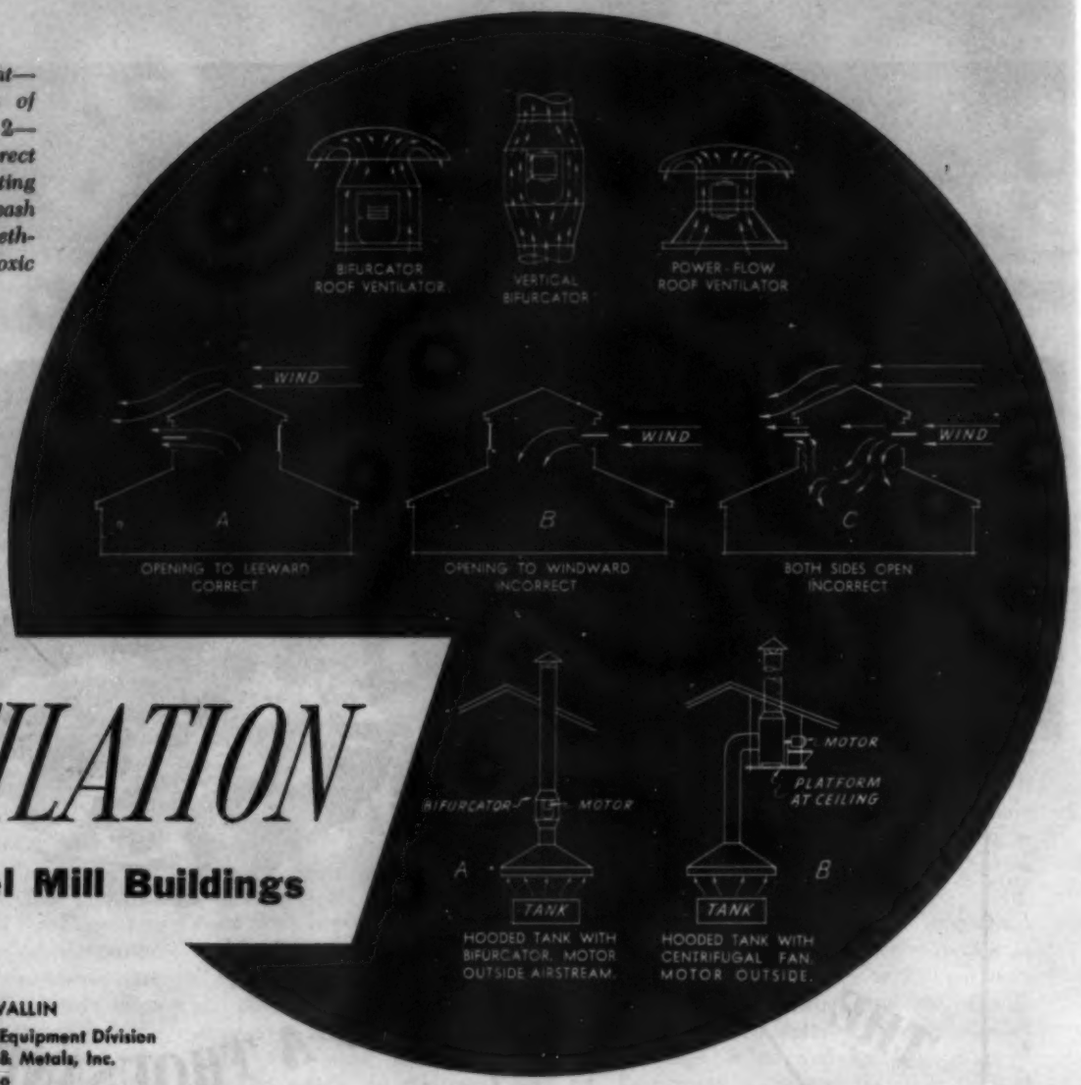
Air Conditioning and Commercial Refrigeration Department, Division 435, General Electric Co., Bloomfield, N. J.

Air Conditioning by **GENERAL ELECTRIC**

Top to bottom, right—Fig. 1—Three types of roof ventilators. Fig. 2—Correct and incorrect methods of ventilating buildings with glass-sash monitors. Fig. 3—Methods for exhausting toxic fumes



VENTILATION
for Steel Mill Buildings

By G. E. WALLIN
DeBothezat Ventilating Equipment Division
American Machine & Metals, Inc.
Chicago

MANUFACTURE of iron and steel is an ancient art which gradually has become a science that controls quality and analysis with exactitude. Heat and hazardous fumes have always plagued iron masters. But the removal of heat and fumes has long been a problem which either has been obliquely or entirely ignored. The solution at first, perhaps, was an open door; then an uncovered hole in the roof; monitor windows or open monitors; and then gravity ventilators which grew and grew in size and weight until the time came when special consideration of roof strength had to be made to carry the load of the closely spaced and ponderous units.

Large sums are still spent on construction and maintenance of glass-sashed monitors which soon cease to transmit light. Roofs are still designed to carry many heavy gravity ventilators. The sash is invariably left open on both sides of the monitor so that wind blows in or through the upper strata instead of aspirating the air from the building. Correct and incorrect methods of ventilating buildings of this type are shown in Fig. 2.

Many steel plant buildings—open hearth in particular—have open construction monitors resulting in exhaust of some of the hot air or fumes from one side, but also blowing back a large portion. In winter, the rising warm air is chilled by cold entering wind and immediately begins to fall back toward the floor with resultant eddies and turbulence near the roof, but not exhausting appreciably.

In some buildings used for sulphuric acid pickling the acid laden water vapor is produced in such quantity that workmen have a set of signals to avoid each other in cold weather—the fog being so dense that seeing more than a few feet is impossible. Brick and steel in the building are deplorably corroded, but even then the fog alone is dispersed by raising the room temperature above the dew-point with unit heaters. The acid fumes are allowed to escape as best they can.

Severely irritating and toxic fumes in most plants, of course, are exhausted mechanically either by centrifugal fans or axial flow pressure fans connected to hoods above, or slotted ducts at the lip of tanks and connected to the fans by means of duct work discharging to the outside of building, as shown in Fig. 3. Most steel mills have mechanical ventilation from laboratory fume-cupboaords; and many of the metallurgical departments have, or are considering, mechanical exhaust from their etching tanks.

For heat removal, steel mills still cling to the gravity ventilator or roof monitors. The effect of wind on the monitor in producing suction usually is unimportant, or actually may be detrimental as previously shown. Gravity ventilators of the stationary type are somewhat affected by velocity of wind, but the maximum results are usually obtained when wind blows straight down on the ventilator top—a condition which seldom occurs.

The type of gravity ventilator (non-stationary) which has a guide vane to swing the outlet away from the wind is

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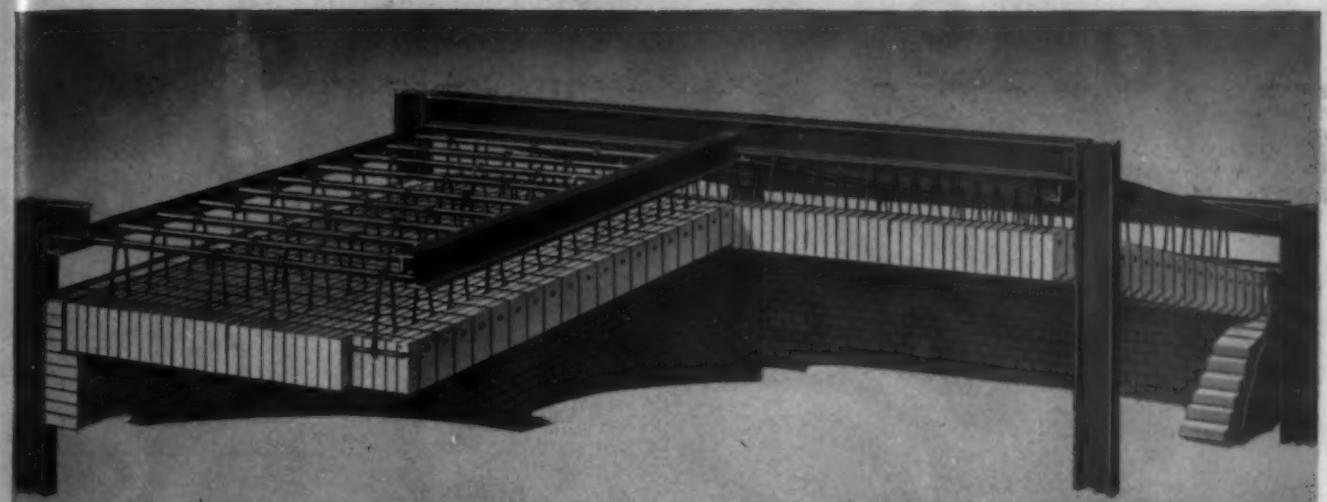

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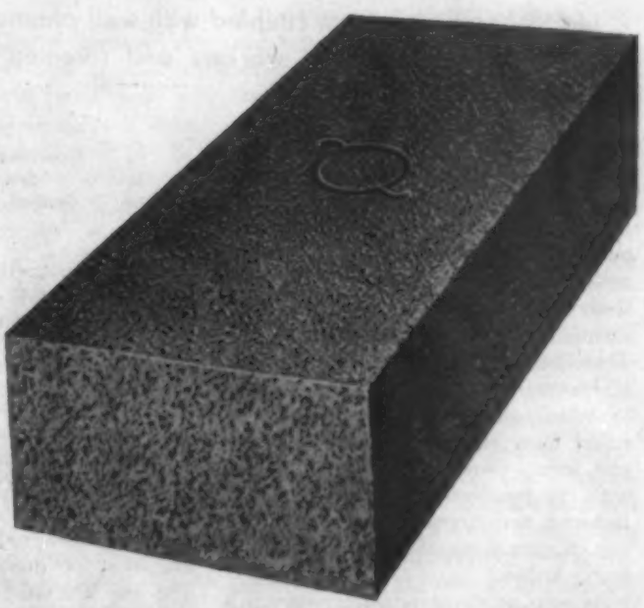
Under present conditions, standard B&W designs, such as the one illustrated, help reduce man-hours — and headaches.

B&W Arch Units are easy to apply; suspension members, being standard pipe and rods, are readily obtainable.

B&W Sales Engineers will assist you in selecting the proper design and refractories. Enlist their help — without obligation.



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BABCOCK & WILCOX

Materials Handling Facilities Play Important Part in . . .

Segregation and Reclamation

Salvage operations at General Electric Co.'s Erie plant handles huge volume of material by employing effective materials handling system coupled with well planned segregation education among plant workers and foremen

(Concluded from Last Week)

By F. E. BLIVEN
Supervisor of Salvage
Erie Works
General Electric Co.

Aluminum: The basic *Order M-1-d* covering the segregation of aluminum scrap has possibly received the most detailed application of any of the strategic metal directives. While we have relatively small accumulations of aluminum scrap, we have 26 separate segregations. These have been established in the line of known requirements in each division in which aluminum is used either in rolled form as sheet or bar or in the cast form. Close contact is maintained with the purchasing, production, manufacturing and engineering forces so that any changes in specifications are immediately known.

As soon as the standard type scrap is filled, it is moved to the Salvage Department but must be tagged by the inspector in conjunction with the foreman. We have one style of container throughout the works. This was designed some 14 years ago and is first of all substantial and is painted a standard black with a color banding which denotes the building from which the scrap comes.

A number of schemes with respect to stenciling numbers of departments, signs on the barrels, and various supplementary color codes have been tried but most of these appear impractical. The use of a color code on the bar has not been found satisfactory even in jobs that are repetitive in nature, as in the screw machine department. Segregation depends on supervision.

In certain operations wherein aluminum is used in conjunction with stainless steel, we meet with a complication either that the stainless steel is machined along with the aluminum and produces aluminum with a trace of stainless or that the stainless contains a trace of aluminum. In either case infiltration must be controlled to a minimum. The most harmful combination is stainless mixed with the aluminum.

In the case of aluminum in stainless steel, the aluminum presumably volatilizes in the melt and does no particular harm, possibly it has some beneficial effect on the steel. We try to know what elements are injurious so that when mixtures of aluminum appear unavoidable, they can be kept apart from the clean scrap. This requires close attention to the education of the ever-changing sweeper force.

The aluminum scrap in 1942 from the Erie Works was 100,000 pounds, sufficient to build five 4-motor bombers, we are informed.

Copper Scrap: Some 4,000,000 pounds of nonferrous scrap is generated in a year, the greater part derived from the building of direct-current railway motors, generators, crane and mill type motors; 3.5 per cent is yellow brass returned to the brass mills under direct sale; 15.7 per cent is copper bearing scrap, principally turnings applicable to *OPA Price*

Top of page—Special trailer unit carries large welded steel containers loaded with scrap. Here a load of alloy steel turnings from the machine shop are being unloaded by the overhead crane, the electric magnet of which here acts as a spreader for the wire rope slings

From a paper presented at the symposium on secondary metals, American Institute of Mining and Metallurgical Engineers, Feb. 17, 1943, New York.

Above—Container unit for handling turnings and borings in the machine shop is special job built from steel plate welded together. Four heavy lifting lugs are attached

Right—Electric magnet on crane is 55-inch in diameter, easily handles enormous quantities of electric sheet steel stampings as shown here

Schedule No. 20 based upon *Schedule C* for high tin bronze and *Schedule D* for high lead bronze classfications. Assays which fix the price, are made on the agreed assay basis. *Schedule No.* 20 has been constructively devised to conserve raw materials. It is a most valuable contribution to the art of fair pricing.

About another 30.8 per cent is copper bearing scrap both refining and smelting grades, shipped to Eastern refiners for conversion into electrolytic wire bar for reshipment to wire rolling mills. *We secure a* 30 *days turnover of scrap from the shop to refiners.* Finally, 50 per cent is copper and copper base alloy scrap, used direct by the Erie Works Alloy Foundry in accordance with WPB instructions. *The cycle of turnover is one week, shop to crucible and electric furnace.*

In as much as we are able to clearly segregate the turnings produced from alloy castings and preserve the known composition, we have used a local ingot company during the past four years to convert turnings to pig form in a reverberatory type furnace. The resultant pig metal is added without change to the melt either in the electric furnaces or in the crucibles and conserves not only copper but also tin and other composite metals in the amounts of the composition.

The chief item of segregated turnings is from *Navy Specification* 46B5 for which we have a heavy requirement. The care exercised in the machine shop and in the Salvage Department to keep these turnings segregated and uncontaminated can be duplicated by others thus conserving a large amount of ingot copper, pig tin, pig lead, slab zinc and pure nickel. This alloy is not readily obtained from scrap which ordinarily is accumulated by ingot manufacturers. The limits are too exacting. The 100 per cent copper scrap which we gather from the manufacture of motors is of vital importance to any refreshening of alloys and for high conductivity copper castings.

The extent to which the value of clean preparation has been carried out is reflected in the following data: 82 per cent of the nonferrous copper bearing turnings are uncontaminated and represent one alloy or metal; 12.7 per cent are mixed turnings with high copper value; 3.4 per cent are low grade sweepings, refinery grade material; 1.9 per cent are turnings which contain two alloys such as a bearing alloy turned with the babbitt during a machine operation. These turnings are not separable until they are reprocessed.

Silicon Scrap: Electric motors use much silicon sheet as well as standard sheet steel. The steel mills will not accept silicon-contaminated black bales. For years the General Electric Co. has insisted on the punch press departments arranging to segregate all items of silicon sheet clippings from the standard or common sheet. As a result the steel companies can save in the use of ferrosilicon in their furnaces. *We shipped from Erie last year approximately* 5,000,000 *pounds of silicon scrap in which they could count on* 35 *pounds of silicon per ton of metal.*

Recently the fabrication department informed us that they would be using a fair tonnage of silicon plate. This material looks like any of the low phosphorous scrap. They immediately arranged that this scrap should be kept separate and will reach us especially tagged so that this material will not be used in the malleable foundry where it would be injurious to the heat.

Dormant Scrap: The General Electric Co. produced 12,622 tons of dormant scrap in 1942. We contributed 1042 tons which with the exception of approximately 180 tons as a by-product of scrap machinery and electric motors is not recurrent scrap. A large tonnage of dies, jigs and fixtures was systematically returned to the furnaces.

From discontinued structural steel items we have been able to construct a number of storage floors, offices and other facilities. Otherwise a good many projects would have been side-stepped. The improvements mentioned were necessary to better performance and in many cases relieved the strain on personnel.

Redesign to Save Material: An outstanding contribution in 1942 was the accomplishment of Walter W. Brown, transportation engineer. Recently WPB awarded Mr. Brown a *Citation For Individual Production Merit,* the highest honor that can be awarded a civilian war worker. Only six other persons have received this award. Mr. Brown completely changed the design of the coupler plugs used in mobile power units. The saving of vital materials on basis of present orders is 8930 *pounds of brass as well as* 21,550 *pounds phosphorous bronze bearing a high percentage of tin, and* 120,900 *pounds of aluminum.*

This change also simplified the manufacture of these couplers. The operation was removed from the machine shop and placed in the Punch Press Department, eliminating a bottleneck in production and accelerating the output. By redesigning the coupler body as well as the coupler, aluminum was eliminated by substituting steel.

Reclamation: In the production of more than 4,000,000 refrigerator cabinets in the 12 year period of manufacture at

Erie, a considerable amount of paint sludge was reclaimed. The early paint systems were lacquer. Sludge was inflammable, required wetting down in order to transport. In the latter part of 1934 through the introduction of the water spray booths and the application of glyptal base enamels, it was possible to retrieve a uniform sludge from both the primer and finish spray booths.

A total of 1,300,000 pounds of sludge was thus obtained and sold for reprocessing. It is roughly estimated that using a ratio of 5 pounds of sludge to the gallon, some 260,000 gallons of paint was thus obtained. It was found later that the primer sludge could be converted into an excellent sealing paste and was largely used for this purpose.

In several of our plants and in Erie we have facilities for refining oils retrieved from the various factory operations. These oils can be cleaned and refined and in many cases placed back in the shop in their original use. In other cases they are mixed with an emulsifier and used as a cutting oil. Schenectady Works has the most extensive facilities.

Above — Magnet on crane also pressed bales of valuable sheet steel scrap

Also, a great many of the solvents are recovered and reapplied. We speak of these recovery methods because the necessary care in providing ways and means to effect savings in nonproductive materials has a large influence when we strive for cleaner segregation on the more valuable and vital items of scrap.

Design Utilization: Material in a repetitive line of manufacture is a high factor of cost. Assume the average size refrigerator cabinet uses 140 pounds of steel. Total scrap loss represented by the hydraulic compressed bales over the period of 12 years in which we produced more than 4,000,000 cabinets at the Erie Works was 64,723 bales, weighing 37,724,994 pounds. This scrap loss which includes the spoilage as well as the natural waste was only 8.77 pounds per cabinet, extremely close to the theoretical minimum for the design of cabinets.

Develops Metal for Rebuilding Worn Parts

A new hard surfacing metal called Durface for rebuilding worn surfaces and parts on machines, equipment worn through mechanical wear, abrasion or for general maintenance and salvaging work is reported by Eutectic Welding Alloys Co., 40 Worth street, New York. It can be applied on steel, manganese steel, alloy steel, cast iron and malleable iron, according to the company.

A ferrous base alloyed with hardening elements such as nickel, molybdenum, etc. make up the composition of the development. According to the manufacturer the metal is being offered bare for torch application and coated for direct and alternating-current applications. The chemical coating for either current does not affect the hardness.

Features of the metal are rapid and very homogeneous flow, high alloying effect, and strong bonding action. It is free of blowholes and is readily applied.

Issues Maintenance Folder for Conveyors

Due to the pressing shortage of experienced maintenance men and the fact that most materials-handling equipment is on grueling, 3-shift wartime schedules, Robbins & Myers Inc., Hoist & Crane Division, Springfield, O., recently prepared a new maintenance folder to help prevent hoist and crane breakdown that might hamper production.

The folder, prepared by R & M engineers, covers varioius phases of maintenance necessary for trouble-free performance. In addition, it is designed to serve as a permanent file for hoist parts lists, diagrams, instruction sheets, etc., enabling maintenance men to keep all such essential material together for quick reference. Copies are available free.

Offers Working Cutout Model of Die Cushion

A die cushion cutout model showing details of pneumatic die cushion equipment as applied to the average punch press is being offered gratis by Dayton Rogers Mfg. Co., 2835 Twelfth avenue South, Minneapolis. Of laminated cardboard, 8½ x 11 inches, it shows in detail how the blank is automatically held in tension and shows how the press tools produce a strong, smooth shell throughout the work cycle of the draw die. It also shows the details of how a single-action press is used in place of a double-action press, or where a double-action press can be used in place of a triple-action press.

The model also gives information on basic working parts of any standard die cushion, together with complete piping diagram for installation and use of pneumatic die cushion equipment.

New Finish Applied Without Primer

A new war time rough metal finish called Pebble-Tex, which can be used with or without primer is announced by Egyptian Lacquer Mfg. Co., New York.

At present it is being used by manufacturers of parts for radio-equipment for military use, and for instrument panels, fire control and listening devices and other service items. The finish is available in a variety of colors and is also recommended for essential civilian articles requiring a rough finish.

Credit Manual Modified by War Status

Credit Manual of Commercial Laws, War Edition, 1943; cloth, 840 pages 6 x 9-inches; published by National Association of Credit Men, 1 Park avenue, New York, for $6.50.

This association publication endeavors to set forth fundamental legal principles and existing statutes in order that credit and business executives may have a convenient guide.

The section dealing with the war situation as related to credit is of particular interest. It covers terms and conditions of war orders, procurement of military supplies, determination of costs under government contracts, renegotiation of contracts, the controlled materials plan and priorities, production requirements plan, financing war production contracts, how to obtain war production contracts and the work of the smaller war plants division of WPB.

Other sections cover the laws of credit, the law of sales, collecting the account and insolvency. Legal forms used in credit work also are presented.

Wide experience in supplying power transmission equipment to practically every kind of industry long ago, conclusively proved that no one or two types of speed reducers could be efficiently adapted to meet all requirements. We, therefore, set about developing a line embracing all types. Thus, today, we can supply the type that is best suited to drive your equipment efficiently, economically and dependably. Philadelphia Speed Reducers are made in Worm (horizontal and vertical), Herringbone, Spur, Planetary, Spur and Bevel, and Spiral-Bevel and Herringbone Gear Types. The Philadelphia MotoReduceR (vertical and horizontal), is also available where a self-contained motor and reducer drive is desired. Philadelphia Units are made in a wide range of horsepowers and reduction ratios. Tell us your requirements and our engineers will give you unbiased recommendations.

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INDUSTRIAL GEARS
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LIMITORQUE VALVE CONTROLS

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Philadelphia
LIMITORQUE CONTROL
operates all types of valves, etc., safely, economically, from convenient stations.

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GEARS
All types and sizes of industrial gears. Can be supplied in all materials.

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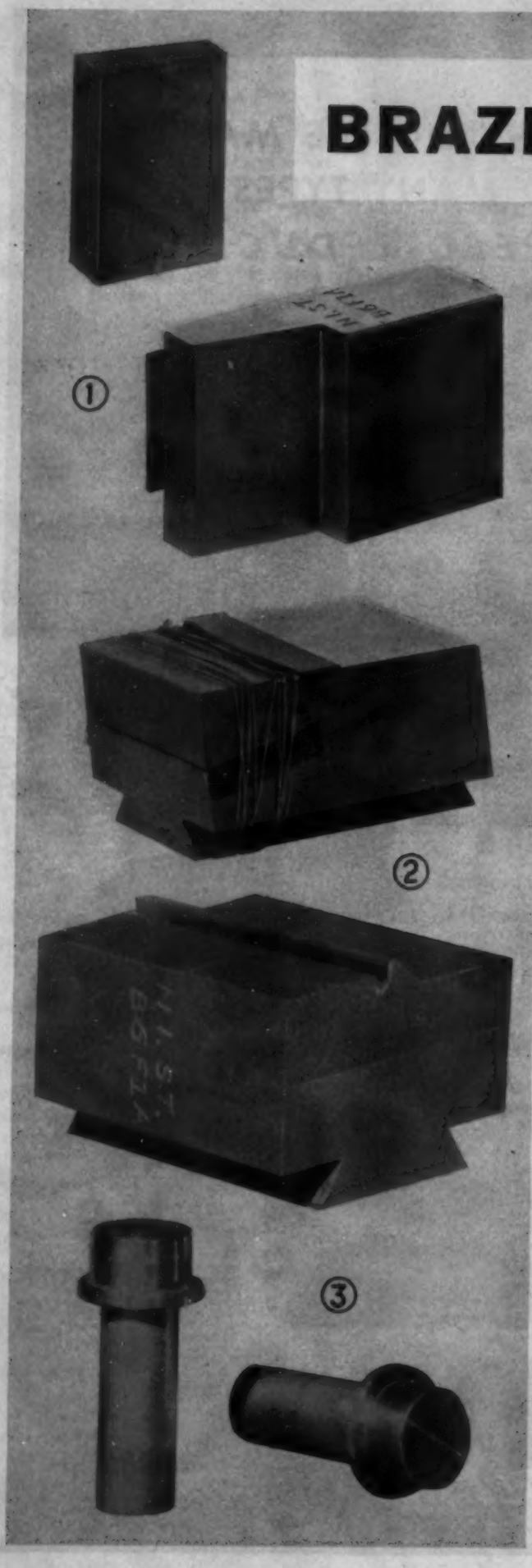
HERRINGBONE SPEED REDUCER
for heavy loads at high speed. Single, Double, Triple Reductions, various ratios and horsepowers.

Philadelphia MOTOREDUCER
The economical self-contained drive, Horizontal or Vertical types — various ratios and horsepowers.

Philadelphia
WORM GEAR SPEED REDUCER
right angle drives — vertical or horizontal. Wide range of ratios and horsepowers.

BRAZE-HARDENING

. . . . high-speed-steel tipped tools. Tip is fastened in place and heat treated in same sequence of operations



CONSERVATION of critical high-speed steel has been responsible for furnace brazing and hardening of high-speed steel tipped tools at General Electric's Schenectady Works. While the practice is not yet in full production, sufficient work has been done to predict its success.

The tool blank is first rough machined and the part which has to be tipped is ground. The high-speed steel tool tip is then ground to meet the exact contour of the blank. This is to assure a definite all-over contact. The tip is then nickel plated and a 0.005-inch copper shim is inserted between the shank and tip. The tip is held in place with a piece of chromium-nickel wire. Both tip and shank are then covered with a suitable flux, and the tool is ready for brazing and hardening.

This is done in a "controlled atmosphere" electric furnace, using Drycolene, a gas developed for use in heat-treating furnaces. Steel that have been treated in this gas are free from surface changes such as decarburization, carburization and oxidation.

The brazing and hardening operations are done at and from the same temperature. The tool is put into the furnace without preheating. It is kept in the furnace long enough to heat up to a temperature of 2375 degrees Fahr. (2250 degrees Fahr. is used if made from molybdenum steel).

The tool is very carefully removed from the furnace so as not to disturb the tip. It is then quenched in oil until it turns black, approximately 1100 degrees Fahr., and then cooled in still air. Next the tool is tempered 2 hours at 1050 degrees Fahr., air cooled and retempered 1 hour at 1050 degrees Fahr. and again air cooled. It is then finish ground.

Hardness tests of the high-speed steel tip indicate a hardness of 64 to 65 rockwell C. While no complete life tests have been made on tools thus far, tests of forming tools working stainless steels at 120 surface feet per minute have been very satisfactory. Several other tools such as reamers, planing tools, dovetailed forming tools and cut-off tools are under test.

Dovetailed forming tool tipped with high-speed steel to conserve critical materials. View 1 shows high-speed-steel tip and shank. View 2 shows assembly prepared for furnace brazing and hardening. In 3 is the completed tool and work produced with it

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Vital for the War Effort...

and for Profitable Peace-time Operations Too!

● Avoid costly down-time while an oiler crawls over a machine lubricating each bearing individually,—and the breakdown if he misses one. You can get more productive hours out of each shift, greater output, with resulting lower costs per unit, by equipping your machines with Trabon Lubricating Systems!

Trabon Lubrication makes absolutely certain that every connected bearing, whether large or small, easy or difficult to reach, receives the exactly desired amount of lubricant, while the machine is in operation. It minimizes machine tie-ups—prolongs bearing life—reduces accident and compensation costs.

On overhead traveling cranes, costly steel mill equipment, forging presses, brakes, shears, crushers,—and boring mills, screw machines, punch presses, and other lighter duty machinery, Trabon lubrication—for years—has been proving its dependability in meeting every industrial lubricating requirement. Install Trabon on your machines and get the many design and operating advantages only Trabon can give you. Manual or automatic operation. Send today—for new fully descriptive engineering bulletins.

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She keeps steel mills Rolling . . .

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THIS little Flexomotive is a regular maid-of-all-work in a Mahoning Valley steel mill.

She does a hundred and one hauling jobs equally well—such as switching and spotting freight cars, delivering scrap, limestone and other raw material to the charging floor, moving molten metal in ladle cars, shifting ingot molds to and from pouring stations, and hauling hot slag to the dumping grounds.

Like all Plymouth Flexomotives, she is direct-driven with a powerful Cooper-Bessemer diesel —quick to accelerate and decelerate, efficient on heavy loads or light, economical in fuel consumption, clean and easy to operate.

It is because of this extreme flexibility and economy that more and more, steel mills and metal plants are swinging to diesel power — and to Cooper-Bessemer powered locomotives in particular.

Locomotive Diesels
Marine Diesels
Air and Gas Compressors

Stationary Gas and Diesel Engines for Industry

A 65-ton Plymouth Flexomotive helping an Ohio steel plant turn out more production for war. Powered by a Cooper-Bessemer diesel.

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO GROVE CITY, PENNA.

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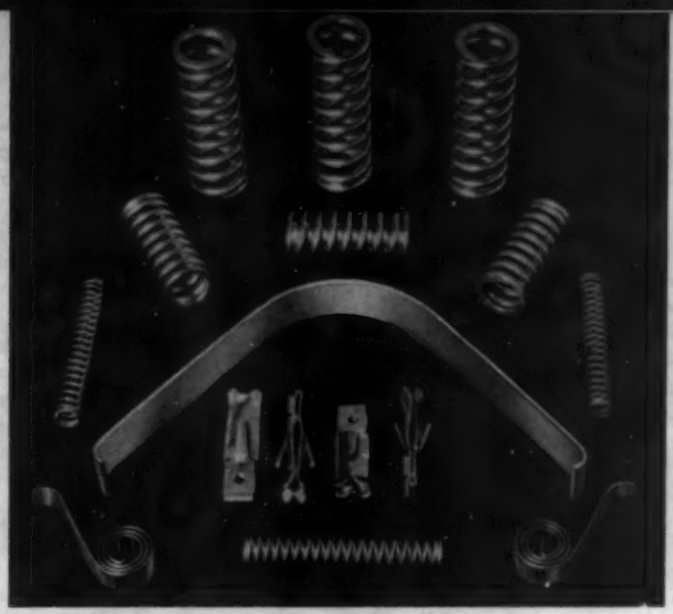


Typical springs and electrical connectors made from beryllium-copper. American Brass Co. photo

BERYLLIUM

. . . . ITS USES, SOURCES OF SUPPLY, NEED FOR LOCATING NEW ORE DEPOSITS

BERYLLIUM is a metallic element used chiefly in the production of heat-treatable strong copper-base alloys for electrical contacts, clips, small springs, etc. Also used in fluorescent lamps, X-ray and ceramics. It may possibly be used as an alloying element with magnesium and aluminum. The potential use of beryllium exceeds the present supply, thus indicating:

—The immediate need for more sources of beryllium ore—particularly in this country.

—The limiting of new uses for beryllium and the study of possible substitutions—until such a time as more beryllium ore is available.

The 1941 consumption of beryllium ore was about 2500 tons—mostly imported from Brazil and Argentina. Our present stock of ore in private companies now totals about that figure—and can last at present consumption rates until Summer, 1943. About 6000 total tons of ore are desired for 1943, and may reasonably be expected.

More than 90 per cent of the demand for beryllium is for the beryllium-copper alloys. Currently, the production of beryllium-copper master alloy containing around 4 per cent beryllium is at the rate of about 3,000,000 pounds per annum. The demand appears to be some 40 per cent above the supply.

However, expansion of facilities for the production of master alloy are under way—sufficient to produce around 10,000,000 pounds annually. No corresponding expansion is projected for other beryllium products.

Uses of Beryllium: The principal use so far developed for the metal is in the production of strong heat-treated copper-base alloys in which the beryllium content varies from about 0.3 to 2.5 per cent.

The second most important use of beryllium, though much smaller, is in the form of oxide or other non-metallic products in the fluorescent lamp, X-ray, cathode ray, and television industries. Certain beryllium salts have the quality, in common with several other materials, of transforming short-wave radiation and cathode rays to visible radiation. Such materials are commonly known as phosphors, and the beryllium salts are the most important phosphors now in use.

The third largest use for beryllium is for ceramics, including refractories. Beryllium is also used in small quantities in the form of the metal itself.

The present source of beryllium is the mineral beryl, found in pegmatites, in which, commercially, the beryllium oxide content is about 10 to 12 per cent, and the metallic beryllium content is about 4 to 5 per cent. There are some thirty-odd beryllium minerals but most of them are rare and have never been seriously considered as commercial sources of beryllium.

Demand for Beryllium Ores: The present consumption of beryl ore is at the rate of about 7 tons a day and may reach 20 tons per day in 1943, if adequate ore supplies are obtainable. It is now estimated that at least 8000 tons will be needed in 1944.

The wider utilization of beryllium for the war effort depends primarily upon the quantity of beryllium ore that can be obtained. Presently scheduled requirements of beryl ore of 6000 tons in 1943 represent an opinion as to available supplies rather than maximum quantities that would be used if more could be obtained.

How Beryllium Is Mined: Most beryllium ore has been obtained as a by-product of mica, lithium, and feldspar mining. Large crystals of beryl are sometimes found by prospectors, but more often uncovered by feldspar mining. In such mines, a ratio of recovered beryl of one half ton per 100 tons of rock moved is common. Practically no mining operations have been started because of the presence of beryl, and this remains an important possibility. Such mines, at present, would have to contain beryl crystals large enough for hand sorting, as concentration methods for small crystals still require development.

What is needed is the discovery of one or more veritable "mountains" of beryllium ore. A concentrated search for new and better deposits is clearly indicated.

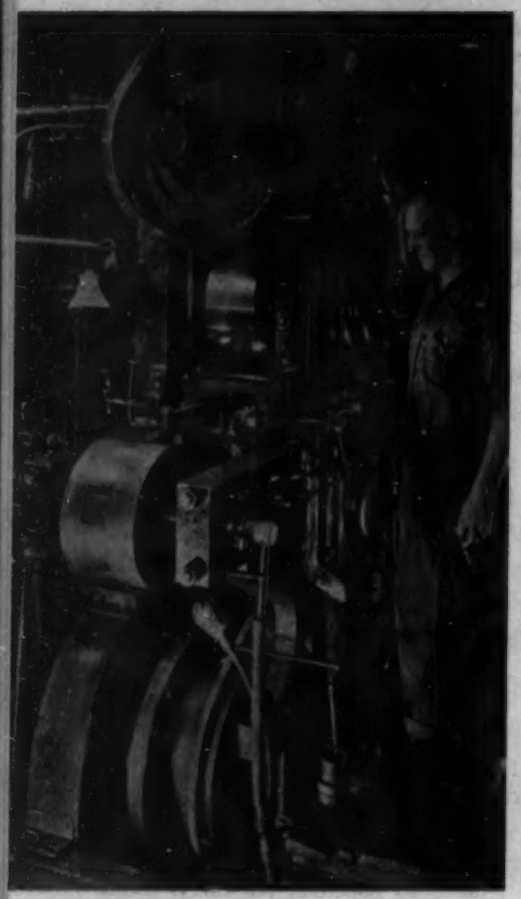
Domestic Supplies of Beryllium Ore: Domestic production of beryl ore has ranged recently from less than 100 to somewhat over 150 tons annually. Increasing requirements have been met by imports, chiefly from South America.

Stocks in This Country: A canvass of principal consumers recently indicated that stocks of beryl in private hands amount to about 2500 tons, or approximately equivalent to the demand for the year 1942.

A 3000-ton stockpile has been authorized by the War Production Board, but only small deliveries have been made as yet on this account. However, the Metals Reserve Company has a general under-writing agreement with Brazil and recently has placed orders or bids on shipments from several countries.

Conclusions and Recommendations Regarding Supplies of Beryllium Ore: Granting a favorable foreign mining and shipping situation, beryl supplies from known sources may aggregate 6000 tons in 1943, but are likely to fall short of

From a report to the War Production Board by the War Metallurgy Committee of the Advisory Committee on Metals and Minerals, National Academy of Sciences.



Small rolling mill such as is used for processing berryllium-copper. American Steel & Wire photo

an estimated manufacturing capacity of 7200 tons per year.

Any large-scale expansion of the uses of beryllium—in excess of the yield from about 10,000 tons of 10 per cent ore a year—rests upon the discovery and concentration of large low-grade ore or on new discoveries of higher grade ore.

Every effort should be made to increase production from western hemisphere mines.

If reports of investigators in Brazil, Argentina, and Colombia are favorable, steps should be taken to increase production in these countries to the economic limit.

Unless new favorable developments change the overall picture, not more than 6000 tons of ore should be scheduled for consumption in 1943, and any ore over and above current requirements should be purchased by Metals Reserve Company until a stockpile of 10,000 tons is created or until large new domestic sources of production are tapped.

While flotation of silicates and other non-metallics is used quite extensively, the process has not been applied to beryllium ore on any commercial scale as yet. However, the Bureau of Mines indicates that laboratory tests show promise in concentrating beryl by froth-flotation when and if sufficiently large and uniform deposits are located and the demand expands. Electrostatic concentration should not be overlooked.

Production of Master Beryllium-Copper Alloy: The chief use of beryllium is for beryllium-copper alloy to obtain a strong, heat treated metal for electrical contacts, clips, small springs, diaphragms, etc. For the production of these copper base alloys, containing beryllium, a so-called master alloy containing about 4 to 4.5 per cent beryllium is first produced. The final copper base alloy has a beryllium content varying from about 0.3 to 2.5 per cent.

Beryllium-Copper Alloys: Beryllium-copper is heat treatable to produce the strongest copper base alloy. Extensive studies have been carried out in various laboratories in endeavors to broaden the use of beryllium-copper alloys and to take advantage of their valuable properties of high fatigue strength; elastic limit and hardness; relatively high tensile strength and electrical conductivity; excellent corrosion resistance; good wear resistance; good resistance to galling against steel and good resistance to room temperature creep (elastic drift); and various fabrication advantages associated with heat treatment or precipitation hardening.

Such studies, in the presence of the war effort, have now borne fruit to such an extent that the demand threatens to exceed the supply. Both copper and tin are conserved by the use of beryllium-copper alloys—where they replace other copper base alloys.

There can be no doubt as to the relative superiority of this alloy for many important applications in both the peacetime and the wartime economy. At the present time beryllium-copper is being used in parts of aircraft, ships, tanks, guns, shells, instruments, engines, motors, radio, telephones, telegraph, tools, and electrical control equipment for machinery and fire protection.

In many cases, where small parts are involved, design factors explain the use of this alloy. Thus, in many aircraft instruments, beryllium-copper is used because its properties make possible the use of a smaller part than would be necessary if any other materials were used.

Alternate Materials: Close inspection of beryllium-copper distribution indicates that virtually one hundred per cent is now going to vital components of direct and indirect military end-products. Accordingly, if supply is insufficient, substitute materials will have to be found. In general, beryllium-copper has replaced phosphor bronze, aluminum bronze, and alloy steel, and these materials provide the most likely substitutes.

Alloys containing less beryllium than the conventional two per cent variety will, no doubt, suffice for many applications.

Recent work on low temperature heat treatment of cold-worked brass and bronze has already resulted in the replacement of beryllium-copper springs with ordinary nonberyllium-copper alloys.

Nickel-Beryllium Alloys: Physical properties of alloys of this type are good but obtainable in other alloys of nickel at lower cost.

Beryllium metal is used to make vacuum tight windows for X-ray tubes. The metal is first made in a vacuum melting equipment and cast into small ingots. The metal can then be hot rolled—the rolled pieces having a very slight cold plastic bendability. They can be mounted as windows in X-ray tubes and have the advantage of transmitting soft X-rays ten to twenty times as well as the next best material.

Magnesium-Beryllium Alloys: It has been reportetd that a small amount of beryllium is helpful in connection with the manufacture of magnesium base castings. The total quantity of beryllium required for this purpose is small.

Beryllium is almost insoluble in molten magnesium at all temperatures. There are no magnesium base alloys containing any substantial percentages of beryllium.

Aluminum-Beryllium Alloys: A great deal of work has been done looking toward the development of a suitable aluminum-beryllium alloy. Tests on certain alloys, made experimentally, show that the hot strength is very considerably above that of the other aluminum alloys.

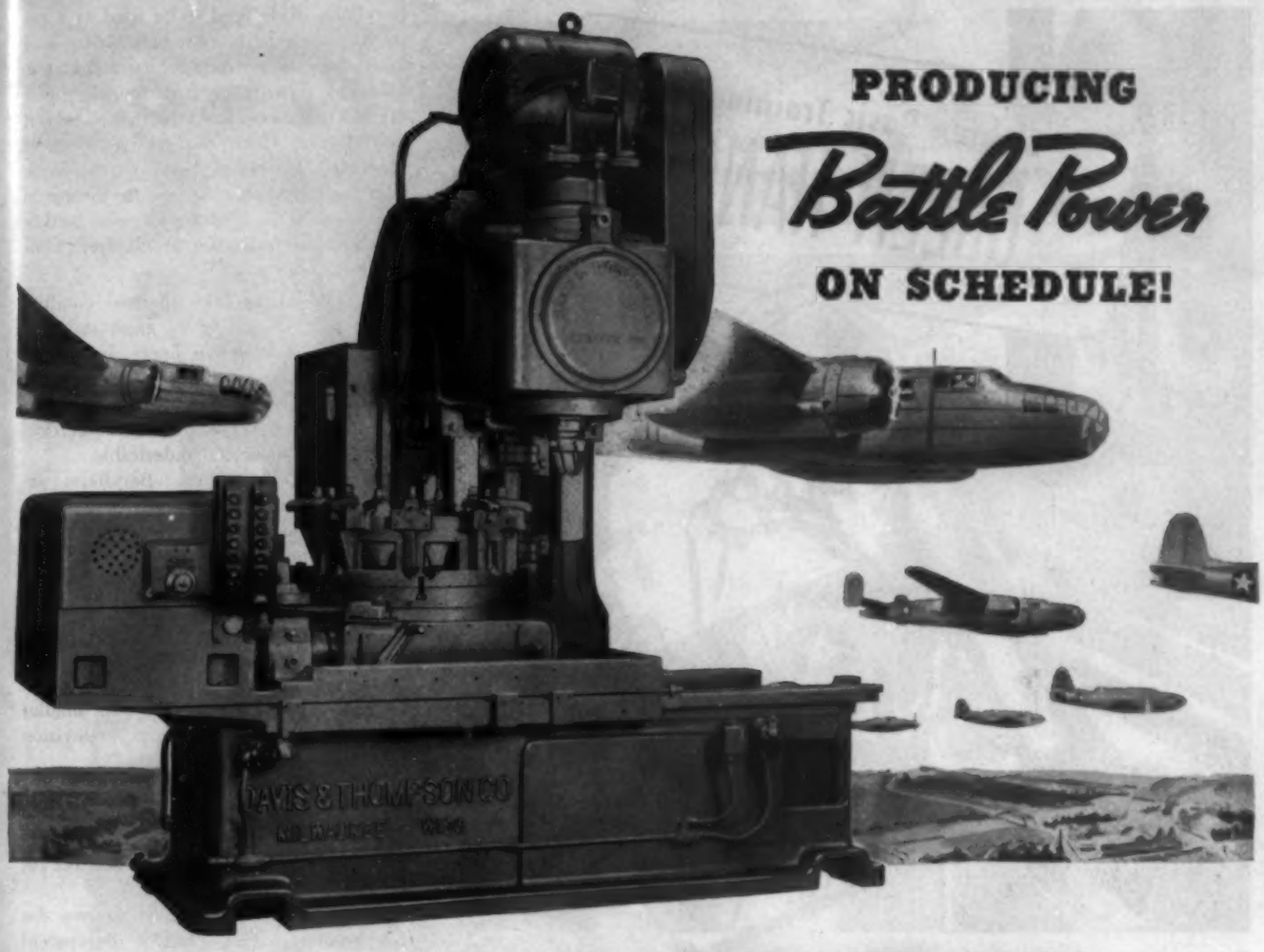
The thermal conductivity is also of a high order, and the thermal expansion is low. These properties seem favorable for aircraft pistons and certain other engine parts.

There has been some progress in producing workable ingots of approximately 35 per cent beryllium weighing 10 or 15 pounds.

Even from these small ingots small instrument parts and various specialties requiring low density, stiffness, and good machinability could be manufactured but the cost would be high. The availability of aluminum base beryllium alloys for major items of aircraft or engine construction cannot be seen around the corner and should not be viewed as a wholly probable short-time outcome of present efforts in this direction.

Beryllium Oxide as a Refractory:

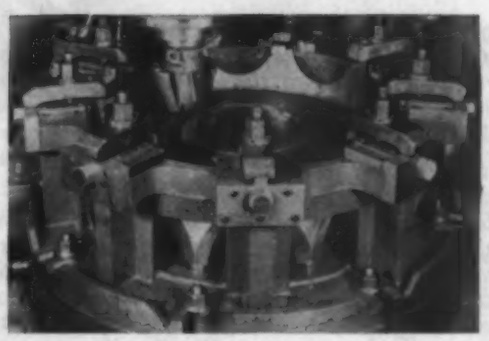
PRODUCING *Battle Power* ON SCHEDULE!



FULLY automatic, electrically controlled, hydraulically operated, this 34" open vertical type D&T miller speeds the contour milling of the inside of crankcases for radial type airplane motors, on the fastest schedule ever established.

All the operator has to do is load the part into the fixture, push the cycle button, and unload the finished crankcase. Rapid traverse speeds the table to approximate milling position. Rapid traverse lowers the head. Then, in "feed" speed, head and table move to precise operating position . . . the table rotates, the milling cycle is completed, the table backs away, and the head rises again to the loading position, ready for the next crankcase! All automatic . . . fast . . . accurate!

Thirteen tons of metal are engineered without waste into this smooth-working precision machine. It stands 12' 10" high . . . is remarkably compact, using floor space only 8' 4" x 5' 10" . . . has a husky 5⅞" spindle with 8⅞" flange, with change gears for various spindle feeds. Entire head equipped with frictionless



FULLY AUTOMATIC . . . FAST . . . ACCURATE

bearings . . . precision roller bearings on spindle . . . ball bearings at all other bearing surfaces.

Similar machines, with rotary tables up to 87", mill large gear blanks, tank rings, and other big parts . . . fast!

Send for our "Victory Production" book. It cites many other typical examples of rugged, compact, automatic D&T multiple-spindle boring, drilling, milling machines specially designed for high production.

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Simplest way to reduce the basic training period for inexperienced employees is by cutting down the number of different handling steps they need to learn!

In Foxboro Measurement and Control Instruments, leading warplants have found a safe means to eliminate all but the simplest, routine manual steps in controlling processes that require critical temperatures, pressures or flow rates. Automatically, exact measurements are always available to guide workers . . . graphic records are supplied wherever needed . . . often, manual control is completely replaced. Even "green hands" can maintain efficient, quality production!

Make this note for post-war planning! "Learn how Foxboro Instrumentation can shorten the basic training for efficient, quality production." **The Foxboro Company, 118 Neponset Avenue, Foxboro, Massachusetts, U. S. A.**

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"For outstanding production", The Foxboro Company has been awarded the Army-Navy "E" Pennant.

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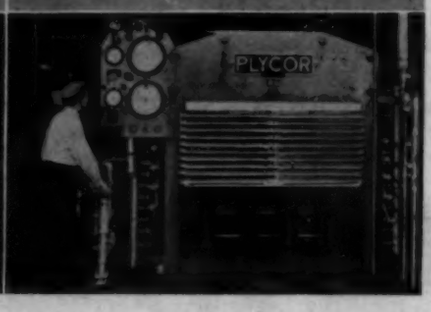
MEASUREMENT AND CONTROL SYSTEMS

Foxboro Instrumentation like this completely controls production of critical wartime materials such as plastics.

With Foxboro Temperature and Pressure Controllers on plywood presses, even "green hands" produce speedily, accurately.



Beryllium oxide fired to be used as a refractory material is extremely strong and hard and very resistant to thermal shock. Of major importance is its melting point of 2570 degrees Cent. which is about 500 degrees Cent. higher than that of alumina. Moreover, beryllium oxide in combination with other oxides seems to confer upon the mixture its own quality of electrical resistance at elevated temperatures.

In spite of its high thermal conductivity, but because of its great stability, beryllium oxide, when finely divided, is an excellent heat insulator for high temperature furnaces and especially for high frequency insulation where electrical conductivity may be undesirable.

Beryllium Phosphors: Beryllium oxide is the most important fluorescent material used in fluorescent lamps. Materials having the property of transforming radiation of a given wave length into radiation of longer wave length are now referred to as "phosphors". Beryllium phosphors are used in about 92 per cent of the present production of fluorescent lamps. They are also used in smaller quantities in X-ray screens, television and other cathode-ray tubes.

One pound of beryllium oxide is sufficient for more than 4000 fluorescent lamps. About 10,000 pounds of beryllium oxide annually will be needed for phosphors.

The best substitute now known for beryllium as a phosphor in fluorescent lamps is cadmium. Besides requiring eighteen times more cadmium oxide than beryllium oxide, the initial light output is 20 per cent lower with cadmium, and the maintenance of initial light output is only 73 per cent of that of the beryllium phosphor at the end of 500 hours. It will be preferable to pay considerably higher prices for beryllium phosphors than to use cadmium. Large savings in the consumption of electrical energy result from this use of beryllium oxide.

Developing Solution Prevents "Blueprint Rash"

"Blueprint rash" no longer need be the lot of blue print operators with the use of a new development called Hi-Tense Concentrate, recently introduced by Wisconsin Pharmacal Co., Milwaukee.

The developer, according to the manufacturer, is not only non-irritating to hands immersed in it, but also has the additional advantages of producing sharper blueprints, free from brown spots, as well as being completely non-corrosive to tank linings, and non-staining if spilled on clothing.

The product is supplied in highly concentrated form, a pint bottle being diluted with water in a ratio of 1:320—making 40 gallons of solution.

Lesson in FERRACUTE FLEXIBILITY

JUST CHANGE THIS TO THIS

and Swing INTO PRODUCTION

Quick change-over to meet war-time or peace-time retooling demands is achieved in this FERRACUTE DRAWING PRESS. Just replace ram, pitman stem and strap with new double-action mechanism and you're ready to start production.

TRADE FERRACUTE MARK

The well-known Ferracute heavy frame coupled with the added tensile strength of the stay rods makes this press especially suitable for drawing or cutting heavy sheet metal. Stay rods may be safely removed but should be replaced when performing work approaching the limit of capacity. Open throat permits feeding stock from front and back in addition to side feeding. By inclining the press, gravity causes the finished work to fall freely to the rear of the press. Flexibility in this press is furthered by its adaptability to either V-belt or geared drive.

FERRACUTE MACHINE COMPANY

Presses and Press Brakes

BRIDGETON, N. J., U. S. A.

INDUSTRIAL EQUIPMENT

Goggle Cleaning Station

Mine Safety Appliances Co., Braddock, Thomas and Meade streets, Pittsburgh, announces a goggle cleaning station said to encourage workers to wear their goggles and to keep them clean. Designed for wall mounting, the unit consists of a compact case equipped with Fogpruf—an efficient lens cleaning and antifogging agent—and optical wiping tissues.

Operation is simple, according to the company. A tap on the inverted vial sprays Fogpruf on the goggle or spectacle lens. Cleaning tissues are pulled from the opening in the top of

the station. These later may be discarded in a receptacle in the lower part of the case.

Front panel of the station slides up, making accessible a compartment for an additional supply of tissue and Fogpruf. Six vials of Fogpruf and two packages of optical wiping tissues are furnished with each unit.

Lubricator

J. N. Fauver Co. Inc., Detroit, is offering a new device for the automatic application of controlled volumes of lubricants, ranging from oils to heavy fibred greases, to bearings of conveyor trolley wheels. In use, it is mounted on the trolley rails so it serves simultaneously the bearings of each pair of wheels, every time they pass this point.

The lubricator requires no independent power. It is driven by the travel of the conveyor itself—starts and stops with the motion of the conveyor chain. As the trolley wheel approaches the lubricator the hub engages the sleeve of one of five pumping units which is thus automatically brought in contact with the wheel bearing.

Continued rotation of the lubricator forces the pumping unit inward, deliver-

ing a measured quantity of lubricant through the fitting to the wheel bearing. This operation is performed on the bearings of both wheels of a pair at the same time, and is repeated on all other wheels. Reservoirs of 6 or 12-pound capacity are included.

Anvantages of this method are: Optional use of hard oil, elimination of drip and consequent work spoilage, automatic operation, no external power required, maintenance costs reduced, down time servicing conveyor diminished.

Panel Mounting Cases

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is offering a new type FT Flexitest case for panel mountings which combine a relay and knife blade test switches in the same unit.

Present standard relay elements are

used in the new case. These are mounted on a removable unit chassis. Test connections can be made either by clip leads or test plug. The switches are of high capacity, self-aligning knife-blade construction with the movable blade and hinge jaw mounted on a molded block fastened rigidly to the case.

Each circuit can be identified by cards on the switch handle. Three size cases are available. All have a metal cover with a transparent window for visual inspection of elements and observation of relay targets.

Nibbling Tool

National Machine Tool Co., Racine, Wis., is offering an improved hand-operated nibbling tool for sheet metal. Called the heavy duty model No. 5 Handnib, it really is a combination nibbling, shearing, drill rod cutting and punching machine.

The unit cuts out templets and trial

blanks into any shape in one-tenth the time usually required for such work, it is said. It cuts drill rods of the following sizes: 3/16, ¼, 5/16 and ⅜-inch; punches holes up to ½-inch through ⅛-inch flat stock. Body of unit is of cast steel and all wearing parts are hardened and ground.

Welding Electrode

Frostrode Products, 19003 John R street, Detroit, reports an entirely new development in resistance welding electrode design which, for the first time, makes possible the full utilization of refrigerated welding. Manufacturers who have adopted the new Frostpoint as an integral part of the Frostrode electrode refrigerating process report increases from 600 to 1000 per cent in the number of spot welds made before tips require "dressing", according to the company.

In addition, a 90 per cent saving in copper normally required for resistance

...it can be simplified!

The number of moving parts in any mechanical assembly is an important consideration. A reduction in the number of parts often means greater efficiency in operation and lower cost of production. That's elementary knowledge to every manufacturer.

But many times the manufacturer is too close to the woods to see the trees. He's grown up with his product and is convinced that it is just as simple as possible. Spriesch men have amazed many experts by insisting it can be simplified. We've done it with highly complicated, precision-demanding aircraft armament devices such as automatic bomb-release racks and shackles and cannon feeds.

As a matter of fact, that's why Spriesch now is working 24 hours daily, producing this highly specialized materiel—delivering it on time with a remarkably low percentage of rejections. Spriesch miracle war production is the talk of the country.

Frankly, we seek contact now with responsible people who desire to improve present mechanisms... to develop new mechanical ideas... to produce parts or complete assemblies, experimental or mass production... AFTER VICTORY. Our 36-page brochure "Ingenuity" will give you a complete picture of our physical plant... at the same time will portray our spirit.

Joseph J. Cheney, President.

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IN THIRTY-NINE YEARS OF PROGRESS 1904-1943

THE STORY BEHIND THE WINNING OF THE ARMY-NAVY "E" PRODUCTION AWARD

The men and women of the Pangborn Corporation have been working day and night since long before December 7th, 1941, in order to help overcome the bottleneck that developed in the cleaning of castings, forgings, stampings and heat-treated parts.

Because their all-out contribution of more and better AIRBLAST and ROTOBLAST cleaning units to industry's war effectiveness was found EXCELLENT—they were awarded—on March 13th—the Army-Navy "E" for high achievement in War Production.

We are proud of our employees' loyal and wholehearted cooperation. We are doubly proud of their accepting this award as a *challenge* to ever greater production records—while maintaining always the superior standards of quality and workmanship built into Pangborn products since their beginning in 1904.

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WORLD'S LARGEST MANUFACTURERS OF BLAST CLEANING AND DUST COLLECTING EQUIPMENT

PANGBORN CORPORATION • • HAGERSTOWN, MD.

welding electrodes is forecast by the fact that the only part that needs replacing in the new Frostpoint is the quick-replacable tip on the end of the welding electrode.

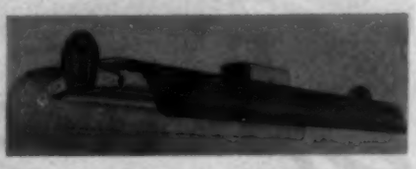
Other features are: Machine and hand dressing of points is completely eliminated; if a tip does mushroom, it is removed and replaced by another in about one minute's time. Its life without any dressing except polishing is estimated to be about equal to that of a conventional electrode re-dressed until no longer useable; cost of recapping a point is only a few cents; the electrode is positively sealed against leakage. This is obtained by the self-sealing method of assembly — greater cooling area being obtained by internal finning of the tip. The new points can be used on any existing welder.

The only attention the caps normally require is polishing, since cooling reduces tendency toward pick-up. Distortion or mushrooming is minimized by the low temperature operation while maintenance of electrode strength also results.

To replace the cap, when necessary, it is gripped in a pair of "electric pliers" with the coolant flow shut off. This frees the cap from the electrode by melting the solder seal. The cap is lifted off and a new one is slipped in place with the fingers. The electrodes on the machine are now brought together under pressure, pushing the cap into place. The electric pliers are again applied, melting the solder to complete the seal. Pressure between the electrodes is maintained until the sealer has again set. To facilitate interchange of different electrode sizes on the same machine, the barrel of the Frostpoint is provided with a hexagon section at one point to facilitate its removal without damage, using a tap wrench.

Lighting Units

Fostoria Pressed Steel Corp., Fostoria, O., announces a new line of fluorescent lighting units which features ease of maintenance and V-shaped wiring channels.



Physical characteristics of the line

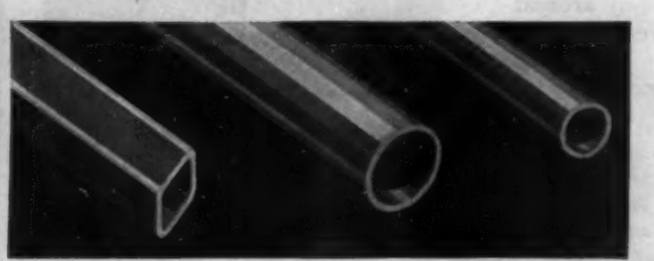
Announcing— FARROWTEST

—THIS NEWEST METHOD OF TESTING PROVES THE SOUNDNESS OF REPUBLIC ELECTRUNITE AIRCRAFT TUBING

• Today's most positive method of testing steel aircraft tubing—FARROWTEST—is the culmination of 13 years of intensive research.

It is an electronic test that easily detects minute imperfections which may be invisible to the eye and not detectible under ordinary methods of testing.

It is a *non-destructive* test—made without strain, heat or other test media which might even slightly impair the original properties of the tubing.



Every length of Republic ELECTRUNITE Aircraft Tubing is subjected to FARROWTEST.

In addition, ELECTRUNITE offers the advantages of *consistent uniformity* of wall thickness, diameter, strength, hardness, weldability, concentricity, weight, ductility and smooth surface—because it is cold-formed from flat-rolled steel and electric resistance welded. It meets specification standards of the U. S. Army Air Corps; Bureau of Aeronautics, U. S. Navy; and the Civil Aeronautics Administration. Write for further details.

REPUBLIC STEEL CORPORATION
Steel and Tubes Division
Sales Offices · Cleveland, Ohio
GENERAL OFFICES • • CLEVELAND, OHIO
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Union Drawn Steel Division
Truscon Steel Company
Export Department: Chrysler Building, New York, New York

—Republic

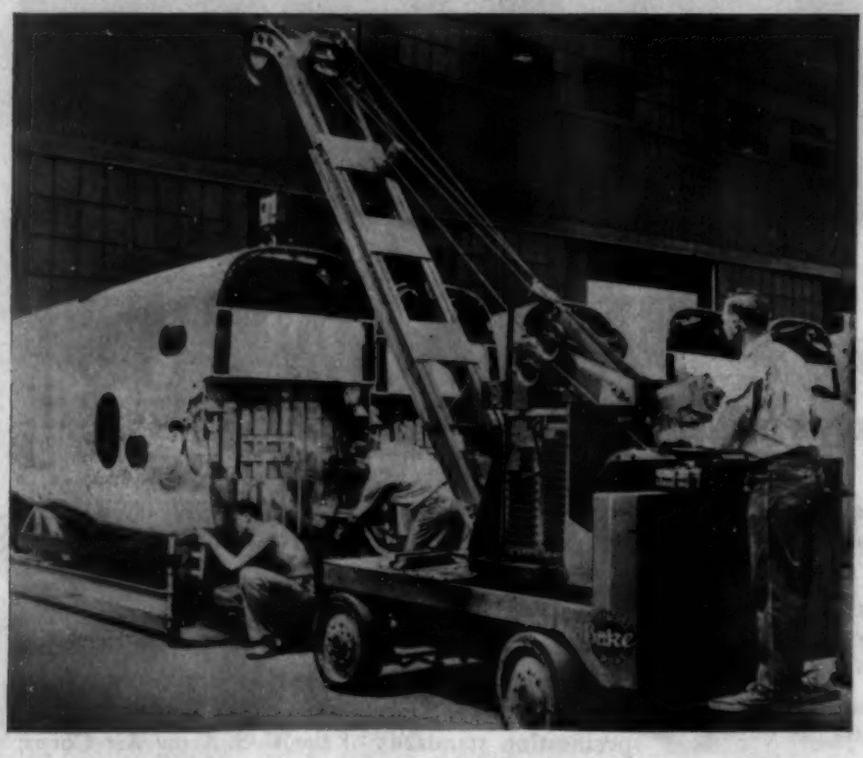
REPUBLIC STEEL CORPORATION, STEEL AND TUBES DIVISION, IS THE ONLY PRODUCER OF ELECTRUNITE TUBING

ELECTRUNITE

Reg. U. S. Pat. Off.

AIRCRAFT, MECHANICAL AND STAINLESS STEEL TUBING

North American speeds airplane assembly with BAKER TRUCKS



● The versatility of the Baker Crane Truck is demonstrated by North American Aviation, where it speeds many assembly operations on the B-25 Bomber and the P-51 Mustang Fighter. Among the services it performs are moving fuselages into assembly positions, assisting in the installation of engines and propellers, and general heavy duty around the plant. North American also uses Baker Hy-Lift Trucks for handling heavy dies.

Baker Trucks are contributing to war production in hundreds of other plants. A Baker Material Handling Engineer will be glad to show you how our equipment may solve your problems.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2167 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

comply with WPB's latest L-78 order and conform to recommendations of the Bureau of Standards.

The nonmetallic reflector of each unit is removable without turning off the current or removing the lamps. The company is offering two 2-lamp models—model MF-240 with two 40-watt lamps and model MF-2100 with two 100-watt lamps. Where continuous line lighting or individual 4-lamp models are desired, three units are available—MF-2-240 using four 40-watt lamps, MF-2-2100 using four 100-watt lamps and MF-2-2100-S using four 100-watt lamps but requiring only one 4-lamp ballast.

Voltage Tester

Superior Instruments Co., 227 Fulton street, New York, reports a new model 590 voltage tester said to read like a

thermometer. It automatically indicates whether the voltage is 110, 220, 440 or 660 volts; if current is alternating or direct; if motor, etc., connected in the line is "open"; which leg is "grounded;" if frequency is 25 or 60 cycles; if the fuse is "blown"; when one side of a motor connected to the line under test is "grounded"; excessive leakage between a motor and a line; and when a three phase motor is running erratically due to a "blown" fuse.

Four individual type NE-7 neon bulbs used in conjunction with a network of resistors provide most of the services necessary for industrial electrical maintenance. The multicolored etched steel panel of the tester reads easily, and the

Here's sting

FOR THE GUN THAT TEARS ZEROS TO PIECES

AIRCRAFT armor, within practical limits, is no protection against the terrific fire-power of America's .50 calibre machine gun. The high ratio of enemy planes destroyed for each one of ours lost is one measure of the lethal sting it carries.

That sting—in the form of a new bullet-core steel—was developed more than two years before the ".50" began to stutter in the far East and over the battlegrounds of Europe and Africa. At that time, .50 calibre bullet-core steel was made with tungsten—and was entirely limited to electric furnace production.

Foresighted ordnance experts, who realized the danger inherent in America's dependence on tungsten imports, put it up to steel makers to produce a substitute steel for bullet-cores *without tungsten*. It was a tough job and was marked "urgent."

Our metallurgists and steel engineers went to work. Using only domestic alloys they developed a steel that meets every requirement of the U. S. Government. From cold finished bars of this steel, bullet cores can be produced almost 50% faster. Even more important, this steel can be made by the Open Hearth process.

As a result—even with tungsten supplies cut off—our munition makers today are able to turn out .50 calibre bullet cores in quantities that stagger the imagination. Badly needed electric furnace capacity has been released for other important uses. And Uncle Sam's fighting men are backed up with plenty of ammunition for the hard-hitting gun they swear by—whose stinging power in more than one important action has spelled the difference between defeat and victory.

Today a great part of our capacity for Amercut Cold Finished Bars, particularly in high-grade alloys, is required for production of what is admittedly the best .50 cal. bullet-core steel ever produced. Peacetime experience has made it possible to turn out unprecedented tonnages of this superior bar stock. It has high hardenability, consistently uniform quality, and is ready for fast machining. Post-war industry will find that it opens up many new and interesting applications for shock-resisting steels.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* — United States Steel Export Company, New York

UNITED STATES STEEL

Let
LAMSON
do the moving!

In the production of shell-cases, for instance, Lamson Conveyors are saving vital manpower all along the line. From raw material to finished product, through machining, heat-treating and inspection operations, Conveyors have eliminated wasted hours of unproductive handling. In one ordnance plant alone the rough forgings enter on Lamson V-Type Gravity Conveyors, are moved through 27 operations in the plant, and into the freight cars. When you realize that these cases weigh 140 lbs. in the rough and emerge completed still weighing 75, you know that they are too heavy, and go through too many operations to be moved by hand for fast production. But Lamson doesn't stop here — even on battlewagons our Intermediate Hoists and Conveyors pass these shells to their ultimate destination against the Japs!

Write for new Wartime Conveyor Bulletin ST

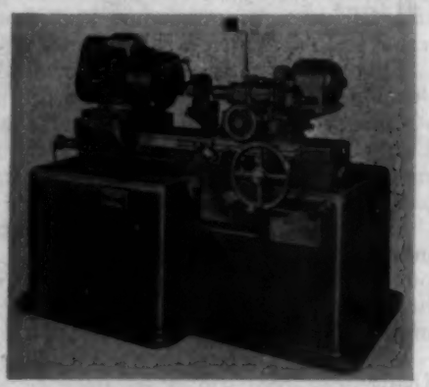
LAMSON CORPORATION
Syracuse, N. Y.
Makers of Conveyors and Pneumatic Dispatch Tubes

unit is completely housed in a rugged, hand-rubbed wooden box. The neon bulbs are permanently protected against jarring by a snug sub-assembly type housing.

Internal Grinder

Sav-way Industries, 4839 East Eight Mile road, Detroit, announces a new internal grinder which provides both hand and hydraulic table operation. Each of these, it is said, is wholly independent of the other; though it is possible to use both hand and hydraulic feed in combination—on the same job, and in the same setting.

Hand operation is said to give the worker complete control for setting up;



and to be frequently preferable for short holes, blind holes and facing. With the hydraulic system high table speeds by power are obtainable for long holes. Table speeds of the unit range up to 55 feet per minute. Minimum table stroke is ⅜-inch—maximum 24 inches. Base of the grinder measures 70¼ x 48½ inches and it requires 105 x 48½ inches of floor space.

Lighting Transformer

Acme Electric & Mfg. Co., Cuba, N. Y., reports a new style cold cathode lighting transformer especially designed for industrial applications. It has a capacity of 120 miliamperes in 3000, 4000, 6000, 9000, 12,000 or 15,000-volt secondaries.

Strictly a heavy duty, vibration proof unit, the transformer has a standard conduit box for primary connection and built-in parallel electrode housings for direct connection of the cold cathode tubes.

In addition to the savings in critical materials, the "lamp life" of cold cathode tubes makes for inexpensive maintenance, according to the company. Installations under test have shown continuous operation of 20,000 hours and more without appreciable loss in light output or replacement of tubes.

FAST-ACCURATE

FOR SMALL PARTS PRODUCTION

★ BUY U.S. WAR BONDS ★

Specifications

Hole thru spindle—1⅜"
Collet capacity round—1"
Swing over bed and saddle wings—10¼"
Effective feed of turret slide—4"
Turret face to spindle, maximum—19⅜"
Spindle speeds (12)—50 to 1357 r. p. m.
Thread cutting feeds, (48)—4 to 224 per inch
Carriage power feeds, longitudinal (48)—.0015" to .0636"
transverse (48)—.0006" to .0309"

South Bend (Series 1000) Turret Lathe

Designed primarily for machining small, accurate parts, the Series 1000 South Bend Turret Lathes have proved to be highly efficient in hundreds of war production plants. Because of their versatility and wide range of spindle speeds they are readily adaptable to many classes of operations.

These lathes have the stamina to maintain close tolerances at top speed on heavy production schedules. Conveniently placed, easy-acting levers for operating the turret, cross slide and collet save time and reduce operator fatigue. In addition to the handlever cross slide, the carriage has compound rest cross slide with power operated feeds for turning and facing operations, also lead screw and split nut feeds for cutting screw threads.

Lathes in this series are available in both metal bench and floor leg models. South Bend Toolroom Lathes and Engine Lathes are made in five sizes ranging from 9" swing to 16" swing. Write for a copy of Catalog 100C.

ARMY E NAVY

SOUTH BEND LATHE WORKS

SOUTH BEND, INDIANA, U. S. A. • LATHE BUILDERS FOR 36 YEARS

AIR SUPREMACY
AT HIGH AND LOW PRESSURES
HANSEN
AIR HOSE COUPLINGS
Regardless of whether it's high or low pressure, Hansen PUSH-TITE air hose couplings are masters of the air. ◆ Hansen Couplings will handle anything from 1 ounce skyrocketing up to over 14000 pounds without leaking, and that means an "air savings" of considerable volume. But there is much more to a Hansen PUSH-TITE coupling than "air savings," for instance: they are much easier and faster to operate. Nothing to turn, twist or lock. Nothing to bind, jam or stick. Full swivel action eliminates twisting or kinking of hose. ◆ Hansen PUSH-TITE couplings more than pay for themselves in "air savings" and time.
Cutaway section of coupling
Hansen MFG. CO.
1786 E. 27th ST. · CLEVELAND, OHIO

Controlled Firing

(*Continued from Page 96*)

the firing chamber is made entirely of heat resisting alloy. The design of such a furnace part was not easy, and there was little or no past experience to draw upon. Nevertheless this door has given satisfactory service for over one year. The door consists of an alloy frame with an alloy plate set into it, in the same relation as the glass in a picture frame. One course of insulating fire brick rests upon a step extending from the bottom of the frame, and these bricks are entirely enclosed by a large, light gage alloy pan.

Quite recently, when the furnace was down over Labor day, it was found that bulges were developing in these alloy plates. These humps were removed by burning X-shaped cuts in them, followed by chain welding after the area was pounded flat.

Door Design Modified

Although the metal appeared to be in good condition, such a part will probably require replacement sometime within the second year. In a case of this kind, new experience should be used. Examination of the door indicated that most of the deterioration had been caused by mechanical stresses within the door itself. These stresses come from the continual heating and cooling of the various parts of the door at unequal rates. Such effects could be seen particularly in the alloy plate which was welded to the heavy door frame.

Therefore, the original design of the door will be modified so as to break the large areas of alloy into smaller sections, with special attention given to freedom of movement of all parts in relation to the main frame, and relation to each other. This arrangement should prevent any serious stresses from being set up by the expansion and contraction of the various parts.

Discussion questions:

What is the oxygen content of the gas that is produced?

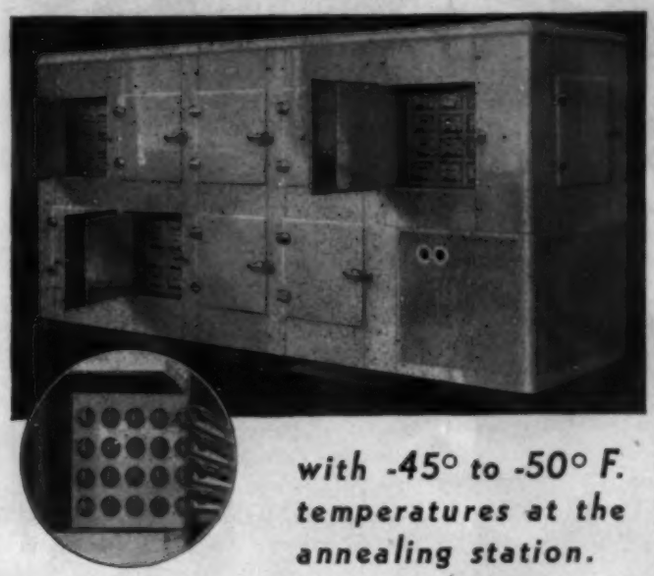
Answer: That gas doesn't have any uncombined oxygen left in it at all. It is a simple matter to use the carburetor setting to change from one side to the other of the neutral point of perfect theoretical combustion. Of course, we went to the rich side in order to be sure all the oxygen will be taken up by the fuel.

It is felt that this is the answer to a lot of enameler's problems because it is a tool with which he can control factors. In the normal way in which you are now firing ware, you can't control all factors, particularly iron oxide.

Question: In burning butane, some water would result, I think. Also, in

KOLD-HOLD Storage

Holds ½ Ton of Rivets in Anneal



with -45° to -50° F. temperatures at the annealing station.

Here's how aging of 17 S-T and 24 S-T aluminum alloy rivets is stopped immediately at the central annealing station.

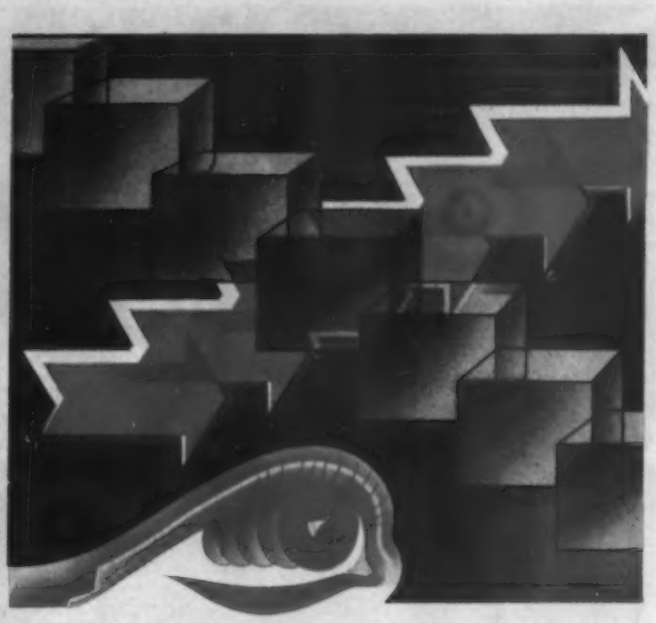
Rivets are stored at once in the drawers, or in horizontal cylinders as shown in the inset above, and pulled down and held at temperatures ranging from –45° F. to –50° F. Capacity is 180 canisters: 20 to each of 9 compartments. Canisters are delivered in portable KOLD-HOLD rivet machines at this same temperature, and transferred to permanent KOLD-HOLD rivet machines along the assembly line as needed.

Savings in man-hours and material from use of the equipment are easily recognized. Maximum efficiency all along the line is attained with a minimum of time and effort required.

What is your rivet storage problem? KOLD-HOLD has the equipment to meet your needs. Send today for full particulars.

NEW YORK — 1819 Broadway — Circle 63092
CHICAGO — 201 N. Wells — Randolph 3986
LOS ANGELES — 1015 W. Second — Michigan 4989

KOLD-HOLD MANUFACTURING CO.
444 N. Grand Ave., LANSING, MICH., U. S. A.



MOVING WITHOUT VISUAL MOTION

Nothing Moves but the Material

Watch a Jeffrey-Traylor Vibrator work . . . you see a smooth-flowing stream of material moving forward, uphill or down, while deck of machine remains visually motionless.

The advantages of the electric vibrating principle for batching, conveying, cooling, drying, feeding, proportioning, screening, sizing, packing or weighing are as diversified as the industries which they serve. The applications are almost limitless.

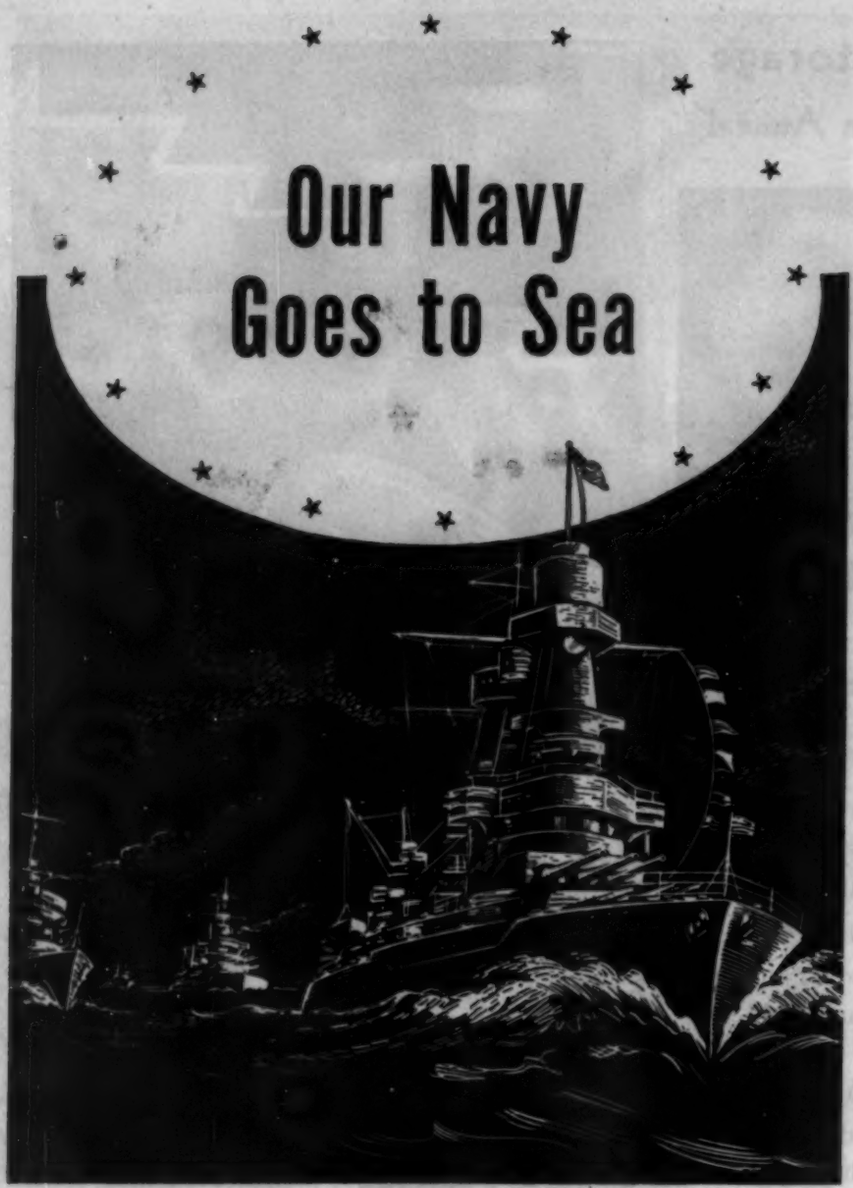
Ores, sinters, foodstuffs, powders, chemicals . . . can be handled efficiently and economically through various processing operations.

Perhaps there's a vibrating unit already built for your needs — if not, Jeffrey can design the equipment which will best serve your plant.

JEFFREY — TRAYLOR DIVISION

THE JEFFREY MANUFACTURING COMPANY
ESTABLISHED 1877
883-99 North Fourth St., Columbus, Ohio

SALES OFFICES: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City



WITH FORGINGS *by Standard*

Seven fleets are now in action . . . attacking . . . convoying . . . protecting. From battleships, cruisers, destroyers and submarines down to escort vessels, mine layers and mine sweepers, Standard steel forgings and castings have helped in putting many of these vessels at sea. Helping to keep them there is the rigidly controlled, dependable high quality found in all Standard steel products. In peace and war, throughout 148 years of our Nation's history, Standard has supplied quality forgings as specified. Not only our armed forces but America's great railroads and industries as well, can attest their worth.

STANDARD STEEL WORKS

DIVISION OF THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

regard to the scrubbing tower, some water vapor would be introduced. I wonder if that water would give you difficulties with fishscaling or difficultics you find attributed to it?

Answer: The water sprays take out moisture by condensing it out of the gas. The moisture in the gas at any time depends entirely upon the dew point of that gas. By cooling the gas down below the dew point it has as it comes out of the engine, we simply squeeze the water out of it.

By using a cooling water that will run about 60 degrees Fahr., it isn't much of a trick to cool the gases down to 70 degrees Fahr. We can't approach a lower temperature without having more equipment.

This cooling under a pressure of 125 pounds per square inch removes as much moisture as if you cooled the gas down to 14 degrees Fahr. at ordinary atmosphere pressure.

We get double use out of the compression equipment—storage of the gas in a moderate size container and this drying effect by cooling gases under pressure.

Gas Becomes Dry

The result is the gas in the firing chamber after being cooled at 70 degrees Fahr., and 125 pounds pressure per square inch has in it only 0.3 to 0.5 per cent by volume of water vapor. That, of course, is quite dry.

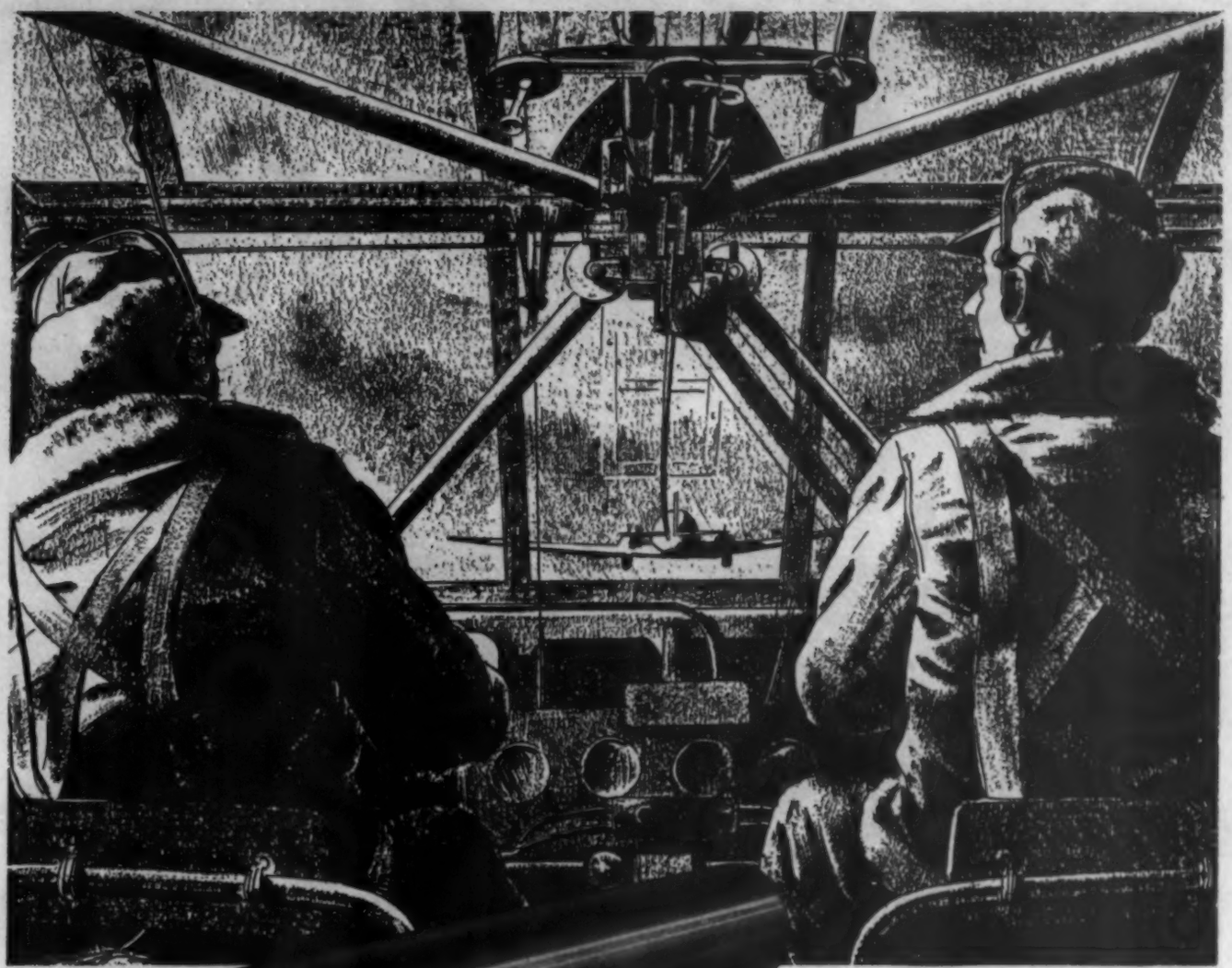
There is some pickup of water vapor because it is not possible at present to completely stop air from leaking inside. Any air that leaks in tends to combine with some of the hydrogen in the fuels. But, as we cut down the leaks we can get back closer and closer to the minimum. We feel we are well under 1 per cent. However, it is very difficult to measure.

Question: Is the atmosphere neutral or slightly oxidizing or slightly reducing to the metal at furnace temperature? What happens if you do deliberately produce reducing conditions in the controlled atmosphere section?

Answer: You always run it on the reducing side. You can run quite high on the reducing side and apparently results are satisfactory. Of course, you get a little less cubic feet of gas per unit of fuel, but otherwise the results are satisfactory. We try to operate at about half-way between neutral and what you would call full reducing conditions.

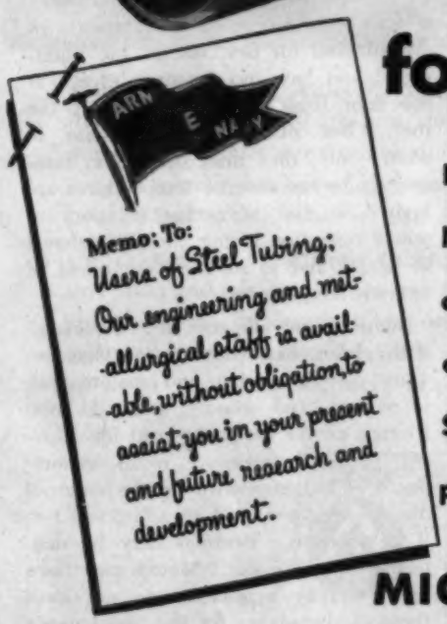
Question: What is the analysis of the gas in the control chamber of the furnace?

Answer: The greater portion of it is nitrogen. Of course, the amount of CO_2



STAMINA

for the Silent Air Armada



High above its carefully chosen objective, a military glider cuts loose from its tow plane and silently completes its course, alone. From that moment, the success of its mission hinges on the skill of its pilots and the stamina of its construction. Seamless steel tubing is an integral part of that stamina, providing maximum strength with lightness of weight.

MICHIGAN SEAMLESS TUBE COMPANY

SOUTH LYON ▲ MICHIGAN

will depend to some extent upon the fuel. Those rates change with the different fuels.

In the case of butane, which is not pure butane either, it will come to about 8 per cent CO_2 and develops a very small amount of water vapor and also hydrogen.

In some butane there is 10 to 15 per cent butylene. In cases where they have propane installations, they use propane entirely. There wouldn't be any practical difference between butane and propane but the analysis would be somewhat different.

Ventilation

(*Continued from Page* 102)

similar in action to the monitor shown in Fig. 2-A. Another type has vanes on the outer surface which cause the whole top to turn like a squirrel cage. Both types require corrosion-proof bearings with low friction so that the ventilator will turn with a breeze of 5 to 10 miles per hour. Most mills, however, avoid any exposed bearings, because of the corrosive atmosphere in industrial districts. A slight binding of ventilator bearings can cause much the same effect as in the monitor of Fig. 2-B.

Stationary ventilators, therefore, are much in evidence in the steel industry and perhaps will remain so until something better can win acceptance. They are used on buildings whose interior is hot; and they are used where inside temperatures are practically the same as outside temperature. Field data disclose that appreciable outward movement of air from a gravity ventilator can be obtained only where inside temperatures are much higher than outside. Relatively cool buildings, in consequence, have little effective ventilation.

Three Factors of Control

Generally speaking, three main factors control air flow from a gravity ventilator: Size of throat, temperature difference, and height of ventilator above floor. Since temperature differences are usually less than 200 degrees Fahr., even in winter, there is not a great pressure difference to cause air movement through the ventilator throat. Gravity ventilator throats, therefore, are usually large, and throat velocities small (with consequent small capacity of unit).

If openings are cut in building part way between floor and roof, the chimney effect of the building is partially destroyed. The building is analogous to a smoke stack: a high stack gives a good draft, a low stack poor draft. And if a large opening is cut halfway up the stack, there is little draft available for boiler or furnace. The capacity of gravity ventilators is affected similarly in hot buildings when windows are open part way between floor and roof.

It should be evident then that gravity ventilators are useful for permitting heat and fumes to escape only when high interior and low exterior temperatures prevail; and for best results, the building should have no openings except at the floor line, or near it, and at the roof. But plants cannot operate in winter only; they must operate in summer too, when exterior temperatures are high. So that advantage is taken of power operation giving constant exhaust in winter and in summer, regardless of interior temperature.

Some disadvantages are associated with power roof ventilators. They require electric wiring and maintenance of wiring, and gravity units do not. Electric power has to be paid for. Moving parts, furthermore, mean maintenance of bearings—two for the motor if direct connected, and an additional two if belt driven. Bearings may be neglected and burn out. Motors may burn out. Gravity ventilators do not have these disadvantages for the maintenance department; but, of course, they do not

FUEL OIL
NATURAL GAS
TIME IS SHORT!
Change to the Victory Fuel now!
AMCO
PULVERIZED COAL
Systems
with automatic control
for HEATING MELTING AND ANNEALING
Fuel oil and gas *must* be replaced *now* with pulverized coal, if operations are to continue at their present record rate. • AMCO is prepared to furnish complete Pulverized Fuel Systems for all types of furnaces in the Steel and Non-Ferrous Industries.
The AMSLER-MORTON Company
FULTON BUILDING · PITTSBURGH, PA.

DON'T ALLOW A BLACKOUT HERE

Your Scrap helps keep 'em blazing

The steel mills of America are expected to produce in excess of 90 million tons in 1943. That means practically continuous operation. A blackout, or even a dimout of the steel furnaces might prove fatal to the cause of the Allies.

Under normal conditions there's plenty of iron ore. But today's conditions are far from normal, and the drain on our iron deposits is terrific. To make ore reserves last, the mills must have plenty of scrap metal. It requires approximately 1000 pounds of scrap for every ton of steel produced. That's why a continuation of the scrap metal drive is so important. That's why the mills and the big users of steel devote so much additional space to the urgency of salvaging all the scrap metal lying around the country. We dare not relax. The scrap metal salvage campaign must continue with undiminished enthusiasm.

Are you sure you are doing all you can to keep the steel furnaces of America blazing?

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

"BULLETS" for the Machine Guns of INDUSTRY!

No defective ammunition wanted here! To speed Victory production, rivets must be round and true, accurate in size, uniform in material.

OLIVER makes that kind of rivets by the tons — in hundreds of sizes and types — as well as millions of bolts and nuts accurately made, cleanly threaded for quick, easy assembly and firm gripping.

Being specialists in the manufacture of fastening devices of all kinds, Oliver can provide the types best suited for your particular requirements.

OLIVER
IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

have to put up with the heat and fumes as do the occupants.

Maintenance requirements often can be met by the installation of a high-capacity, power roof ventilator to replace two to four gravity units. This results in only one-half to one-third the metal area in each unit requiring protection against weathering. A nonoverloading type axial-flow fan should be used, i.e., the brake-horsepower should remain practically constant whether the ventilator damper is tight shut or wide open. This requirement is important in order to eliminate burned-out motors and overloading of power lines. Motors should be ball bearing type for vertical operation, and totally enclosed type for protection against dust and dirt. Ball bearing motors for this service require grease lubrication at about 6-month intervals, or only yearly if the service is light. Fans should be direct connected to standard synchronous speed motors for low initial cost and also to avoid belt maintenance and the necessity for lubricating the extra bearings.

Units are available with the entire top capable of being tilted back and remaining open like a trunk lid. The maintenance man no longer has to grope through a small access opening in the ventilator base to lubricate the bearings; and the fanwheel and motor are completely visible for regular inspection.

The ventilator top should be weatherproof and preferably lightproof at all times. If back draft dampers are required, they should be inside the unit away from the corrosive atmosphere of an industrial district.

The disadvantages of having to furnish electric power and wiring have to be reckoned with, yet low initial cost and easy erection are compensating factors; but the important advantage is constant dependable exhaust regardless of wind or weather or inside temperature.

The steel mill operator, converted to power operation, may decide to install fans in a few of the old gravity ventilators. Certain precautions should be observed, however, in order to obtain results comparable to those obtained with a complete set of units designed specifically for fan operation.

First of all, gravity ventilators should be dampered shut when power ventilators are used in the same area; otherwise the power unit will merely pull outside air into the building through the nearest gravity unit. Thus neither type will be able to do its intended work.

In the second place, it should be remembered that gravity type ventilators are designed for low velocities, so that obstructions and sharp changes in direction of air flow then are not important. If a fan is installed in the ventilator throat to

INDUSTRY'S *vital* FASTENERS

must be

UNIFORM
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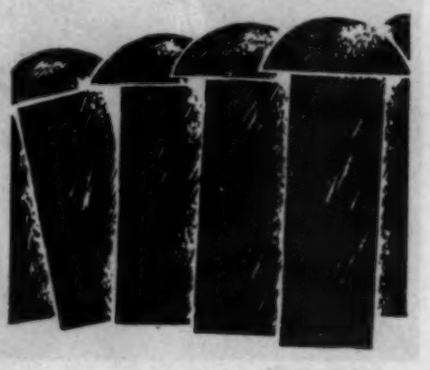
DEPENDABLE



The vital bolts, nuts and rivets you depend upon can help — or hinder — your speeded-up production programs. Your men haven't time to fuss with nuts that don't easily thread-on, or bolts that don't fit accurately.

Oliver takes special precautions to see that threads are clean and true, shanks and heads are accurately made to size, so that they help your men maintain high-speed production!

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IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

Helpful Literature

1. Swaging Machines

Standard Machinery Co.—20-page illustrated catalog section No. SM is descriptive of rotary swaging machines for reducing diameter of tubular and solid bar stock into cylindrical, conical or necked and other special shapes. Line drawings show construction. Specifications are listed. Special equipment and devices for use with standard machines are also included.

2. Furnace Atmospheres

Surface Combustion—12-page illustrated catalog is entitled "The SC Primer of Prepared Atmospheres". It concerns different types of furnace atmospheres, their preparation, application and relative cost. Effect upon steel of most common gases encountered in prepared atmospheres is summarized. Catalog shows typical installations of controlled atmosphere furnaces.

3. Pump Valve

Milton Roy Pumps—2-page illustrated bulletin No. 426 explains how "Step-Valve" used in company's line of pumps is designed for specific purposes and how it functions in pumping against pressures up to 20,000 pounds per square inch. Double-ball checks used in valves are claimed to be non-clogging and self-cleaning.

4. Metal Clad Switchgear

Roller-Smith Co.—12-page illustrated catalog No. 1110 describes horizontal drawout metal clad switchgear in 100,000, 150,000 and 250,000 kilovolt-ampere capacities at 5000 and 15,000 volts. Catalog points out advantages of reliability and ease of installation and maintenance. Complete dimensional data is included on various types of gear available.

5. Dust Collector Hoods

Claude B. Schneible Co.—4-page illustrated bulletin No. 842 shows how dust, fumes and odors are readily controlled through proper installation of "Uni-Flo" dust hoods. They are designed for use in connection with company's line of "Multi-Wash" collectors. Equipment is manufactured in variety of types and sizes to suit varying operating conditions and is available in single self-contained units as well as multiple-unit systems.

6. Carbide Tools

McKenna Metals Co.—52-page illustrated vest pocket manual on "Kennametal" tools contains complete information on care, handling and most efficient methods of using carbide tools. More than 100 drawings show applications, operations, tool styles, instructions for grinding, tool design and brazing blanks to used shanks to make metal cutting tools.

7. Aluminum Welding

Turco Products, Inc.—4-page technical paper gives details of procedure involved in "Koldweld" cold dip method used for cleaning and deoxidizing aluminum for spot welding. In addition to covering effectiveness of this process, suggested system is shown. Various solutions to be used are listed.

8. Coolers

Ross Heater & Manufacturing Co.—4-page illustrated bulletin No. 4922 is descriptive of type "BCF" lube oil and jacket water coolers for smaller sizes of diesel and gas engines, reduction gears, thrust bearings, turbines, hydraulic presses and other applications. Coolers are made in both multi-pass flow and single-pass flow types. Sizes, weights and dimensions are listed.

9. Synthetic Rubber

United States Rubber Co.—40-page illustrated bulletin No. 43-1 is entitled, "The Five Commercial Types of Synthetic Rubber." Full data and properties are given on "Buna S", "Buna N", "Neoprene", butyl and "Thiokol" types of synthetic rubbers. Comparative properties of natural and synthetic rubbers are discussed. Manufacture of various types is explained.

10. Industrial Equipment

Whiting Corp.—24-page illustrated bulletin, "Whiting Products for Industry," contains pertinent facts on this company's line of products which include cranes; railroad and aviation equipment; cupolas and foundry equipment; power shears, hammers and stamping machines; evaporators and filters for process applications, and special equipment for heavy industries.

11. Chucking Fixture

Zagar Tool, Inc.—8-page illustrated folder is descriptive of the "Zagar" collet chucking fixture which is a universal device for indexing and holding work on machine tools. Details of design, operation and typical applications of this unit are given. Fixture is available in 1 and 2-inch sizes which will accommodate most work.

12. Portable Hoists

Manning, Maxwell & Moore, Inc.—8-page illustrated bulletin No. 348A describes "Budgit" portable electric hoists which operate from lamp or power sockets. Hoists are made in sizes to lift loads weighing up to 250, 500, 1000 and 2000 pounds. They are equipped with conductor cable 15 feet long. No other accessories are necessary. Bulletin lists specifications and shows typical installations.

13. Production Facilities

V. E. Sprouse Co.—20-page illustrated bulletin, "A Specialized Service in Metal Products," shows facilities of this company in experimental work, shearing and blanking, metal spinning, stamping, machine work, welding and brazing, finishing and inspecting. Typical parts and complete machines made on contract basis are shown.

14. Motor Driven Controls

Reynolds Electric Co.—4-page illustrated folder No. 71 describes line of motor driven controls which provide supervision of process sequences. Typical applications of these motor driven, cam-operated units are shown.

15. Drives & Couplings

Ramsey Chain Co.—24-page illustrated catalog No. 642 describes complete line of chains, sprockets and couplings for positive power transmission. Advantages claimed for chain drives, typical installations and engineering data on chain drives are covered. Flexible couplings for all types of applications, as well as miscellaneous power transmission equipment are described.

16. Electrical Controls

Square D Co.—48-page illustrated catalog, "Air-Line," contains descriptive and engineering data pertaining to wide variety of light weight electrical control devices for 12 and 24 volts, direct current. Although designed primarily for aircraft and tank use, these devices are also used on boats, trucks and other types of portable or mobile equipment. They will operate in any mounting position under severe conditions of vibration, acceleration, temperature and pressure.

17. Lathes

South Bend Lathe Works—8-page illustrated catalog No. 10 covers 10-inch "Toolroom" lathes and 10 inch "Quick Change Gear" lathes in both floor leg and metal bench models. Both lathes are made in two types; with 1-inch maximum collet capacity and twelve spindle speeds, or with 11/16-inch maximum collet capacity and six spindle speeds. Attachments, accessories and tools for use with these lathes are listed.

18. Diamond Dust

J. K. Smit & Sons, Inc.—4-page illustrated folder on diamond dust tells what to look for in diamond dust for industrial purposes. "JKS" dust is made of clean, fresh bort. Particles are homogeneous, providing maximum of sharp cutting edges. Dust is recommended for fast lapping of tungsten carbide dies and tools, as well as for lapping gages and similar tools.

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19. Internal Grinding Wheels

Sterling Grinding Wheel division, Cleveland Quarries Co.—6-page illustrated folder is entitled "Internal Grinding with Sterling Grinding Wheels". Wheels are used for finishing surfaces of straight, cylindrical, tapered, straight and formed holes. Recommended specifications for internal grinding of various kinds of materials are listed.

20. Centrifugal Castings

Shenango-Penn Mold Co.—8-page illustrated bulletin No. 143 explains making of centrifugal castings of bronze, "Monel" metal and alloy irons. Charts show comparative government and technical specifications, desired chemical analysis, average or minimum physical properties and applications of various types of ferrous and nonferrous alloy castings.

21. Boring Lathe

Wickes Brothers—4-page illustrated bulletin No. DB-10 presents specifications and shows design features of 90-inch double-end boring lathe which is designed for extra heavy duty work for boring large hollow forgings. Each end is equipped with separate feed mechanism driven by variable speed direct current motor, and with power rapid traverse.

22. Inspection Tools

George Scherr Co.—4-page illustrated folder describes "Scherr Limited Budget Inspection Laboratory" for guarding against rejections, disputes and loss of time, labor and material. Fourteen types of measuring instruments, tools, gages and optical inspection devices are briefly described.

23. Safety Equipment

Strauss Co.—4-page illustrated bulletin No. 143 covers line of head and body protection for men and women industrial workers. Included are protector helmets for both men and women, welders' helmets, rain and storm capes, safety hats and breast protectors for factory women. Supplementary sheet relates how protective hat saved life of one worker.

24. Seamless Tubes

Tubular Alloy Steel Corp.—4-page illustrated bulletin, "Seamless Alloy Tubes," discusses manufacture and application of seamless tubing which is pierced from solid billets of alloy steel. Tubes are available in current range of alloys in sizes from ¼-inch to 8⅝ inches in customary wall thicknesses for properly authorized "Production for Victory" uses.

25. Plate Punch & Table

Thomas Machine Manufacturing Co.—4-page illustrated bulletin No. 125 covers essential features of plate punch and table for punching all kinds of ship, tank, boiler, car and similar plates. Standard type punch is combined with fully adjustable table. Quick, accurate positioning can be obtained for rectangular and odd shapes. One man can operate machine.

26. Electric Welders

Thomson-Gibb Electric Welding Co.—4-page illustrated bulletin, "A Dozen Ways to Conserve Critical Materials," describes tool and maintenance welders of flash type which may be used for toolmaking and repair operations. Capacities range from 5 to 800 kilovolt-amperes. Typical weldments which may be performed are shown.

27. Strip Steel

Thomas Steel Co.—30-page illustrated catalog, "Classification of Extras—Cold Rolled Strip Steel," is guide for specifying and calculating prices for this material. Size extras are tabulated for both cold rolled strip and cold rolled spring steel.

28. Identification Badges

St. Louis Button Co.—8-page illustrated folder No. 10 is descriptive of employe identification buttons, pass cases, tool checks, time checks and similar identification devices. Various types are shown and list prices given for different quantities.

29. Vitamin Products

Vitamins Industrial—16-page illustrated bulletin, "Vitamin Protection Means Production and Profit," explains use of vitamin products in industrial plants. Program which will gain cooperation of employes is outlined.

30. Steel Construction

J. H. Williams & Co.—4-page illustrated bulletin No. 3 is descriptive of the "Saxe" welded erection system which is claimed to offer many advantages in construction of buildings, steel trestles, bridges or assemblies where steel parts must be located and held for welding. System uses erection seat and clip which locate and hold members firmly in place.

31. Tank Linings

United States Stoneware Co.—8-page illustrated bulletin No. 1502 covers "Resilon" corrosion resistant tank linings. This resinous thermoplastic material is readily applied to tanks or other process equipment and provides protection against corrosion. Material is low in cost and is easily installed.

32. Pump Unloader

Worthington Pump & Machinery Corp.—6-page illustrated bulletin No. W-404-B1 describes synchronized suction valve unloader for regulating delivery of reciprocating pumps. Electrically controlled and air actuated, this device provides uniform rate of flow intermittently applied, variable rate of flow continuously applied or combination of these two functions for hydraulic machinery operation.

33. Variable Speed Drive

Westinghouse Electric & Manufacturing Co.—4-page illustrated bulletin No. B-3256 describes "Mot-o-trol" electronic alternating current variable speed direct current motor drive which provides wide stepless speed range, automatic speed regulation and smooth fast acceleration with automatic current limitation.

34. Air Motors

Smith-Johnson Corp.—4-page illustrated bulletin on model AM "Senacon" air motors shows typical applications of these small air-driven, double acting, reciprocating power units. These devices are available in various strokes ranging from 1 to 18 inches, with standard piston diameter of 2⅛ inches to develop piston thrust of 4.9 times air operating pressure.

35. Gas Burners

Selas Co.—8-page illustrated catalog No. 231-B is descriptive of "Superheat" burners which are high speed, concentrated heat sources fueled with gas and air only. These units are adaptable for flame hardening, flame annealing, mechanized brazing, preheating and other localized open heat treatments. Capacity and selection data are presented for all standard burners.

36. Swivel Connections

Trabon Engineering Corp.—2-page illustrated bulletin No. 424 describes available types of straight and angle swivels which are suited for making oil, grease, air or other line connections between stationary, and revolving or oscillating surfaces. They are available in standard ball bearing and light duty constructions in either 90-degree angle or 180-degree straight designs.

37. Fastening Devices

Tinnerman Products, Inc.—4-page data bulletin No. 171 is suggested list of typical nonstructural "Speed Nut" applications in aircraft. Types which conform to various specifications, for use with machine screws and sheet metal screws, are covered.

38. Hard Chrome Plating

Udylite Corp.—8-page illustrated bulletin, "Beat the Small Tool Shortage," discusses hard chrome plating as "presalvage" treatment of files, gages, cutters, drills, reamers, dies, broaches and other small tools. Tools may be restored to dimension by hard chrome plating and grinding. They will often last ten times longer than ordinary tools. Plating equipment is described.

39. Fluorescent Maintenance

Sylvania Electric Products Inc.—20-page pocket size illustrated booklet is entitled, "Timely Wartime Tips on Fluorescent Maintenance." It outlines proper methods for maintenance of fluorescent lighting installations to obtain maximum service. Setting up maintenance routine, determinating of cleaning schedule, systematic checking and other suggestions are covered.

40. Radiographic Identification

H. W. Knight & Son, Inc.—4-page illustrated leaflet is descriptive of "Knight" marker which readily identifies radiograph used in examination of castings, forgings and machined parts for defects. Interchangeable lead letters or figures permit systematic identification.

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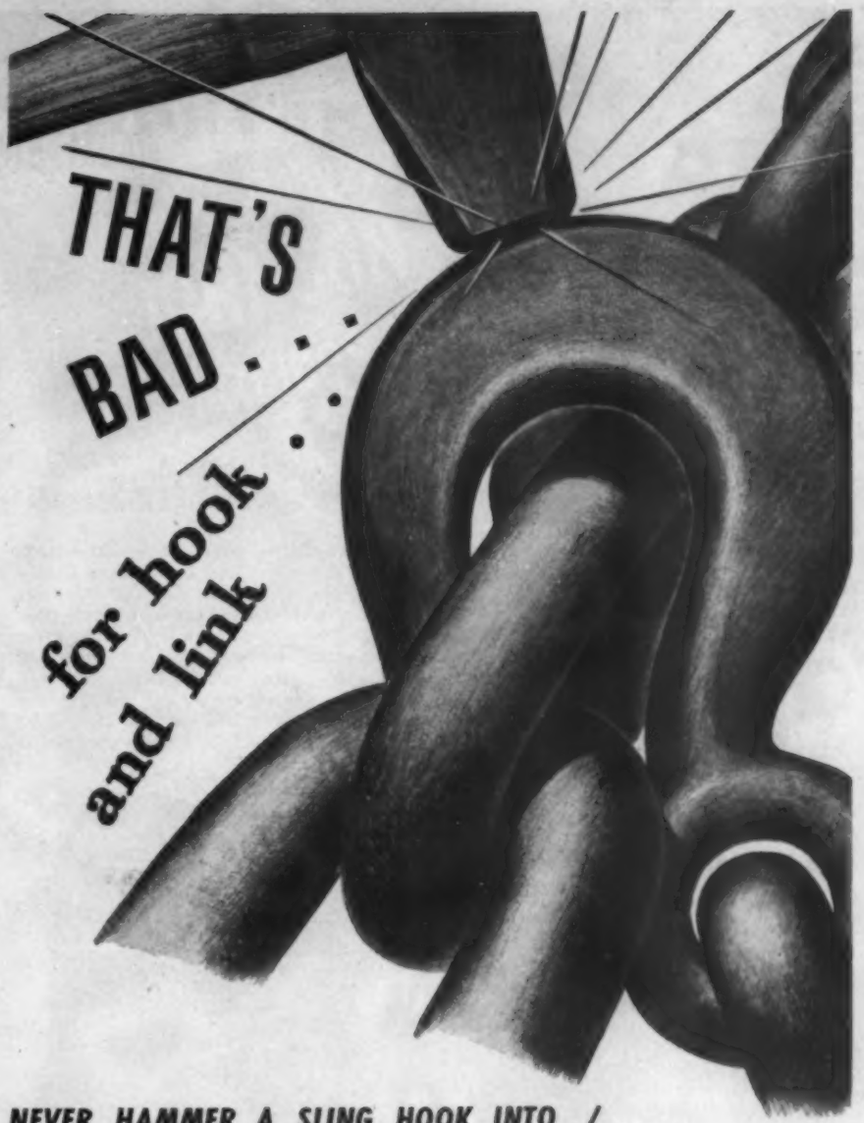
handle air at a velocity of 2000 feet per minute, however, it should be an axial-flow pressure fan selected to operate at approximately ½-inch static pressure (water gage). The cross-sectional area of the throat in square feet multiplied by the desired velocity determines the cubic feet of air per minute which will be exhausted. In any event, the fan should not be selected on a "free delivery" rating. Certain types of axial-flow fans, for instance, will deliver perhaps 10,000 cubic feet per minute at free delivery, and practically nothing at only ¼-inch static pressure. (Pressure loss caused by piping or equipment is usually measured in inches of water column). A given fan may have a catalog rating of 10,000 cubic feet per minute at free delivery, and 7000 cubic feet per minute at ¼-inch static pressure, and without any further data. It does not follow that the delivery at ½-inch static pressure is 4000 cubic feet per minute. In fact, it indicates that the delivery beyond the last amount shown by the manufacturer is so small that it is not published. In other words, one cannot estimate volume beyond the last figures given by a catalog.

Ductwork Not Recommended

Another point to remember is that fans, which have no performance data except at "free delivery", are not suitable for operation with attached ductwork or through equipment such as a ventilator head. If performance data is given in the manufacturer's catalog, it should be guaranteed to be tested in accordance with the standard test code of the National Fan Manufacturers' Association.

A third caution to the purchaser is the matter of ambient or surrounding air temperature at the motor. Ordinary totally enclosed motors are suitable for relatively clean air for temperatures not exceeding 120 degrees Fahr. For temperatures to 150 degrees Fahr., class B (glass) insulation should be used on the motor windings. For temperatures from 150 to 250 degrees Fahr., a unit designed to operate with the motor outside the air-stream should be used. It should be remembered that V-belts in air temperatures above 120 degrees Fahr. have a considerably shortened life. Above 250 degrees Fahr., the motor should be outside the air-stream, and the shaft should have a heat dissipating disk to protect the bearings. An asbestos shield also should be used to protect the motor or bearings from heat radiated from the unit. Bifurcators (a patented unit with axial flow pressure fanwheel driven by a motor separated from the air stream) usually are employed with duct-work to exhaust heat, steam, or hazardous



NEVER HAMMER A SLING HOOK INTO PLACE! *That's the sum total of this story, except the reasons, which are: You may break the hook immediately. Worse, you may damage hook or link or both internally with little evidence of the injury visible. That condition may lead to an unexpected breakdown in mid-air. Pass on to your workers the simple rules for chain safety. You'll largely eliminate chain failure and the consequent casualties, losses and delays.*

● USE WELDLESS CHAINS

Weldless Chain is being substituted successfully in many applications, for welded chain and manila rope. We have at present open equipment for manufacturing the following weldless chains and attachments: ***Tensa****, some sizes, steel;* ***Lock-link****, some sizes, steel;* ***Jack****, all sizes, brass and steel;* ***American pattern****, all sizes, steel;* ***Register****, all sizes, brass and steel;* ***Safety****, some sizes, brass and steel;* ***Sash****, all sizes, steel and bronze;* ***Attachments****, a full line of "S" hooks, swivel snaps, rings and special forms.*

Orders should be accompanied by highest possible preference ratings. Write us about your chain and rope problems.

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The air line we mean is short—but a mighty important one. It is a life line — that provides safe breathing during gas attacks.

As a component of this line there is a little bent piece of copper tubing—Wolverine Tubing—fashioned into a flat shape to conform to the limited space it must occupy.

Seemingly insignificant, it is called upon to assume much responsibility in safeguarding the lives of our men in service. It is carefully shaped to accurate measurements. In order to better withstand all the elements of the weather and the extremely hard service to which it must be subjected this part is made of copper.

It is only one of the hundreds of different specially-formed items that are daily fabricated here at Wolverine from copper that is now controlled from the ore through every step of processing to the finished product.

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fumes directly from the source, instead of general room exhaust.

A fourth class of exhaust problem is the removal of corrosive chemical fumes or steam saturated air. The motor never should be in the air stream under such circumstances, but an axial flow pressure fan with motor outside the air stream (Fig. 3-A) should be used, or else a centrifugal fan, (Fig. 3-B).

Ordinary paint protection, or else galvanized steel or copper construction, is usually sufficient if steam is to be handled. Baked synthetic enamels designed for the specific chemical may be used for relatively weak fumes of the corrosive type.

For sulphuric acid exhaust from pickling operations, a monel metal fanwheel and housing, or a lead-lined housing with rubber covered steel wheel may be used; but not stainless steel. Duriron or ceramic materials should be used for fumes such as nitric acid, nitric oxide, or nitrous oxide, and other powerful oxidizing chemicals. Rubber covering of fanwheel and rubber lining of housing (bifurcator or centrifugal) also perform satisfactorily unless the fumes have a strong oxidizing action.

Plastic Housing Employed

For pickling operations employing hot or cold hydrochloric acid a housing constructed of solid molded phenol-formaldehyde plastic with long fiber asbestos binder is the only material, as far as is known, which stands up under the conditions and yet is relatively low in cost for large capacity. The fanwheel itself must be reinforced metal construction with some sort of protection.

The hard rubber covering of the wheel has been the best solution, but of course the fanwheel must be replaced at intervals. Centrifugal fan housings constructed of other materials also are available but their air-handling capacities are in general relatively small, or their cost is excessive. Where 150 to 250 cubic feet per minute is specified for each square foot of exposed acid surface (depending upon surrounding conditions) it can be seen that exhaust volumes are usually several thousands of cubic feet per minute.

When corrosive fumes are exhausted, duct-work and slotted openings or hoods should be designed for the lowest possible pressure loss, consistent with space and cost, so that fans may operate at low tip-speeds (circumference of wheel in feet revolutions per minute = tip speed in feet per minute). The idea is to reduce the vibration of fan blades to a minimum in order to prevent combined corrosion and vibration fatigue.

A competent ventilating engineer us-

ually can find some method of getting ducts, slots, or hoods right down to the source of fumes, even though overhead cranes, pipes, and building peculiarities seem to make it impossible. Sometimes there is no space for a large fan on the floor or on an overhead platform for a centrifugal unit. Pipes and valves or other equipment may intervene. Many such problems are overcome daily through ingenious devices.

Axial-flow fans with motor in the air-stream or out are extremely compact, and have a large capacity compared to size over a fair range of static pressures when so designed. In many instances, when floor space or platform space is not available, suitable axial flow units may be used inside the building.

Otherwise they may be mounted outside the building; and being light weight compared to capacity, roofs will support them often when heavier type units cannot be accommodated.

But whatever type of equipment is used, it should be selected in conjunction with the design of connecting exhaust and discharge ducts, if any; and allowance should be made also for pressure loss at ventilator tops or weather caps.

Finally, the right type materials should be employed for both duct-work and fan construction.

If, therefore, the type of ventilating unit, fan speed, static pressure loss, fan materials or covering, duct sizes, duct arrangement, slot arrangement and size (or hoods), and duct material are all properly considered by the designer in relation to the specific ventilating problem, the worst conditions of heat and fumes can be overcome or at least minimized.

(*Continued Next Week*)

Heat-Treated Bolts

(*Concluded from Page* 90)

consider employing a larger number of smaller bolts of the same or a higher tensile strength wherever initial tightening is necessary—as is usually the case.

It becomes apparent from this information that any change to a smaller diameter bolt will permit a more effective fastening since the full strength of the bolt can be developed much easier in tightening.

Thus utilizing heat-treated bolts and cap screws not only saves steel and conserves critical alloys but cuts the weight of the fastening, reduces its cost and improves its efficiency. With these facts in mind, every designer not now utilizing heat-treated bolts to their fullest extent will surely be convinced of the importance of re-examining his bolting applications.

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2 Weeks' Delivery on JOHNSON Furnaces

Johnson 575 for Pot-Hardening

Notice the lid-lifting mechanism, which raises cover and locks it in UP position. Heavy 8" insulation throughout, assures maximum operating efficiency and economy. Burners, located near top of combustion chamber, insure longer pot life. Top ring, in 3 sections, prevents cracking and distortion. Steel pot 14" diameter by 20" deep. Large blower assures maximum performance. $325 F.O.B. Factory. (Blower Extra).

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Stands up and delivers under today's gruelling 24-hour a day duties. Heavily lined throughout with 8" high temperature refractory. Fired by 8 Johnson burners, each with individual shut-off, so that lower temperatures can be maintained without disturbing atmosphere of furnace. Use for hardening hi-carbon and hi-speed steels. Firebox 12" high, 23" wide, 34" long. This unit cannot be shipped on 2 weeks' notice.

Johnson 130 A for Heat Treating

Counterbalanced door opens upward, allowing tools to be placed or removed without fully opening door—preventing temperature drops. Firebox 7¾" high, 13" wide, 16½" long. G. E. motor and ¼ H.P. blower. 4-burner unit for 1400 to 2000 degrees — $295. 6-burner for 1800 to 2400 degrees — $325. Prices F.O.B. Factory.

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Immediate WAREHOUSE SHIPMENTS

Steel Orders Absorbing Third Quarter Output

Some sheetmakers find capacity covered for that period. . . Bar situation tightest in large sizes. . . Plate distribution meets requirements. . . April ore movement light

DEMAND

Some contracts extend into 1944.

PRODUCTION

Down 1 point to 98½ per cent.

PRICES

Unchanged.

SOME steel producers find their output for third quarter being rapidly covered in certain products and two important makers of hot-rolled sheets appear booked to capacity and are refusing further orders for that period.

Some bar producers are sold out for third quarter on large rounds and flats, as well as bars requiring special heat treatment. Although some sheet mills are in tight position on hot-rolled sheets they are relatively easy on cold-rolled and galvanized sheets and can offer some shipments for July. Small tonnages of hot-rolled can be booked for July delivery by many makers. Special demand for hot-rolled sheets includes drum stock and heavy gages for landing mats. Ammunition boxes and miscellaneous bomb components add substantially to tonnage in some districts. In contrast to the general situation some narrow strip tonnage is available for shipment in June. Light-gage cold-rolled sheets are in light demand.

• • •

Plate buying follows closely the pattern of recent months, small variations being noted. Distribution of orders is under such close control that tonnage is equitably spread and all essential requirements are being met.

Some orders for wire specialties, including aircraft requirements, spring and valve wire, are being placed for long-range programs into first and second quarters of next year, under the Controlled Materials Plan. The situation in wire is tightening, incoming orders exceeding shipments and heat treating departments, operating at capacity, a choke point for many specialties.

Steel production last week declined a full point to 98½ per cent of capacity, lowest rate since the beginning of February. Pittsburgh lost 1 point to 100 per cent, the largest factor in the decline. St. Louis receded 6 points to 87 per cent, Buffalo 2½ points to 90½, Wheeling ½-point to 92½, New England 5 points to 90 and Cleveland 7 points to 88. Cincinnati gained 3 points to 94 per cent, the only district making an increase. Rates were unchanged at Chicago, 99 per cent; Youngstown, 95; eastern Pennsylvania, 94; Birmingham, 100; Detroit, 96.

Iron ore started moving down the Great Lakes April 24 and in the remaining days of that month shipments totaled 1,954,817 gross tons, 5,902,289 tons less than in April, 1942, a loss of 17.12 per cent. The season movement to May 1 this year was 6,694,891 tons less than last year, 77.40 per cent loss. This is a severe handicap in the race for 95,000,000 tons asked by the War Production Board, which compares with 92,076,781 tons moved last year, an all-time record.

Pig iron production the remainder of this year will depend to considerable degree on blast furnace linings, as high as 10 per cent of stacks in some districts being likely to require major repairs as a result of hard driving for many months. This factor is expected to have more weight in production than supply of ore and coke. Some shifts in demand for iron are taking place, machine tool builders making more of their own castings, with a resulting decrease in subcontracting to jobbing foundries. The latter in many cases require less iron. Malleable foundries are busy, their castings increasingly used where steel formerly was demanded.

• • •

At the moment steel and iron scrap is moving at a rate allowing consumers to choose what they will accept, in marked contrast to conditions prevailing a few months ago when quality was waived. A larger proportion of heavy grades is available and light, inferior scrap is difficult to move. A factor in current supply is activity of government organizations which are bringing out dormant material steadily. Manpower problems still hamper handling in yards in spite of some concessions in higher wage rates.

Loss of beehive coke tonnage because of the coal mining interruption is likely to be felt as an aggravation of the already tight situation and demand is expected to prevent much addition to coal stocks as a cushion against possible further strike interference. Effects of the strike of 1941 are still evident, a large by-product producer being unable in the interval to rebuild coal stocks beyond about one-third normal reserve.

Composite steel and iron prices remain at the established level, held by unchanged OPA prices. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	May 8	May 1	Apr. 24	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	May 8, 1943	April, 1943	Feb., 1943	May, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to 9/32-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	May 8, 1943	April, 1943	Feb., 1943	May, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.265
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	140.65
Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are notsd in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.

(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.

Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.
Tin Mill Black Plate. Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40¼	¾	30	10
½	63½	51	1-1¼	34	16
¾	68½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2¾"	12	17.54	20.21	16.56	26.57
3"	12	18.50	21.42	17.54	29.00
3½"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 30 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
†347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.
Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	65½ off
Do., ¼ and ⅜ x 6-in. and shorter	63½ off
Do., ⅜ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1⅛-1⅛-inch	57	58
1¼ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	†24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	†24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.76	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. ‡For phosphorus 0.70 and over deduct 38c. †Over 0.70 phos. §For McKees Rocks, Pa., add .56 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54
(For higher silicon irons a differential over and above the price of base grades is charged as well as ..... chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Islands, Pa. $23.50
Neville Island, Pa. $23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases $59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.60
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $25.00-28.00
Do., barge 25.00-28.00
No. 2 lump 25.00-28.00
(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (13 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2500 series	AISI hot bars 3100 series
Boston	4.075[1]	3.933[1]	3.933[1]	5.758[1]	3.805[1]	4.187[1]	5.137[1]	5.253[14]	4.775[14]	4.175[21]	4.725	7.783[30]	6.083[30]
New York	3.884[1]	3.778[1]	3.788[1]	5.605[1]	3.611[1]	4.005[1]	4.005[1]	5.031[13]	4.644[14]	4.134[21]	4.805	7.600[30]	5.900[30]
Jersey City	3.884[1]	3.758[1]	3.788[1]	5.605[1]	3.611[1]	4.005[1]	4.005[1]	5.031[13]	4.644[14]	4.134[21]	4.805	.....	.....
Philadelphia	3.843[1]	3.677[1]	3.615[1]	5.293[1]	3.538[1]	3.943[1]	4.293[1]	5.038[15]	4.893[35]	4.093[21]	4.793	7.577[30]	5.877[30]
Baltimore	3.833[1]	3.780[1]	3.605[1]	5.283[1]	3.405[1]	3.933[1]	4.283[1]	4.905[1]	4.883[35]	4.083[21]	.....	.....	.....
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[35]	4.03[21]	.....	.....	.....
Norfolk, Va.	4.098[1]	4.022[1]	3.991[1]	5.496[1]	3.791[1]	4.196[1]	4.546[1]	5.391[17]	4.996[34]	4.196[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[15]	4.30[35]	3.75[21]	3.52	7.35[30]	5.65[30]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[15]	4.20[35]	3.65[21]	.....	.....	.....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.00[34]	3.65[21]	.....	7.45[30]	5.75[30]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[15]	4.00[34]	3.65[21]	.....	.....	.....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[15]	4.05[35]	3.75[21]	3.20	7.55[30]	5.85[30]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[15]	3.95[35]	3.65[21]	.....	.....	.....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[15]	4.30[35]	3.80[21]	3.40	7.67[30]	5.97[30]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[16]	4.77[34]	4.42[21]	.....	.....	.....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[16]	4.77[34]	4.42[21]	.....	.....	.....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[16]	4.37[34]	4.00[21]	3.45	7.69[30]	5.99[30]
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[15]	4.10[35]	3.75[21]	3.50	7.55[30]	5.65[30]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[15]	4.00[35]	3.65[21]	.....	.....	.....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[15]	4.23[35]	3.88[21]	3.54	7.33[30]	5.88[30]
St. Paul	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.50[1]	3.85[1]	3.85[1]	5.00[1]	4.35[1]	4.34[21]	3.83	7.70[30]	6.00[30]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[15]	4.24[35]	4.02[21]	3.61	7.72[30]	6.02[30]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[15]	4.25[35]	3.97[21]	.....	.....	.....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[15]	4.00[35]	3.97[21]	.....	.....	.....
Memphis, Tenn.	3.90[1]	3.95[1]	3.95[1]	5.71[1]	3.85[1]	4.10[1]	4.10[1]	5.25[15]	4.66[35]	4.31[21]	.....	.....	.....
Birmingham (city)	3.50[1]	3.55[1]	3.55[1]	5.83[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.78[35]	4.43[21]	.....	.....	.....
Birmingham (country)	3.40[1]	3.45[1]	3.45[1]	5.83[1]	3.35[1]	3.60[1]	3.60[1]	4.75[15]	4.78[35]	4.43[21]	.....	.....	.....
New Orleans (city)	4.10[1]	3.90[1]	3.90[1]	5.85[1]	3.95[1]	4.20[1]	4.20[1]	5.25[36]	4.95[35]	4.60[21]	5.00	.....	.....
New Orleans (country)	4.00[1]	3.80[1]	3.80[1]	5.75[1]	3.85[1]	4.10[1]	4.10[1]	5.15[36]	4.95[35]	4.60[21]	.....	.....	.....
Houston, Tex.	3.75[1]	4.25[1]	4.25[1]	5.50[1]	3.75[1]	4.30[1]	4.30[1]	5.25[35]	5.43[35]	4.50[21]	.....	.....	.....
Los Angeles	4.35[1]	4.60[1]	4.90[1]	7.15[1]	4.95[1]	4.90[1]	6.70[1]	5.95[15]	7.15[1]	5.70[21]	.....	9.55[30]	8.55[30]
San Francisco (city)	3.95[1]	4.35[1]	4.65[1]	6.55[1]	4.55[1]	4.50[1]	4.50[1]	6.60[15]	7.55[35]	5.55[21]	.....	9.80[1]	8.80[1]
San Francisco (country)	3.85[1]	4.25[1]	4.55[1]	6.25[1]	4.45[1]	4.40[1]	4.40[1]	6.50[15]	7.45[35]	5.45[21]	.....	.....	.....
Tacoma	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.25[1]	5.45[1]	5.70[1]	6.63[34]	5.75[21]	.....	.....	.....
Seattle (city)	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.35[1]	5.45[1]	5.70[1]	6.63[34]	5.75[21]	.....	.....	8.00[1]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore

Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.5c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per G T	Bars per 100 lb.	Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8615	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	.....	.....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 138

Substantial sheet mill capacity is taken up by more or less fixed requirements, which tend to increase, leaving reduced rolling equipment available for miscellaneous buying, which is light, fluctuating with war contracts for fabricated materials. With gasoline containers taking better than 30,000 tons a month, tin mill requirements heavier, warehouse load directives high in the degree of preference, and airfield landing mats requiring considerable tonnage, coupled with capacity lost to plates, a good part of production schedules is accounted for. These fixed requirements, plus limitations on volume of semifinished, extend hot and cold-rolled carbon sheet deliveries into third quarter with scattered exceptions.

Some contracts for cartridge clips in New England have been cut back, deferring narrow cold strip tonnage; paradoxically some strip rerolled in that district is being delivered as far away as the Pacific Coast for fabrication into clips. Requirements for belt links are maintained, while for ammunition casings demand is heavy.

Advance orders under CMP include fourth quarter deliveries while rerollers are booked through the third up to quotas in numerous instances. Balance in production schedules is difficult under numerous revisions, producers attempting to fit tonnage booked into available capacity as to gages, sizes, widths and finish, with annealing the choke point on high carbon and specialty material. In the East much new heat-treating equipment has been installed, but still not enough to meet the pressure for material requiring this processing. Demand for stainless lags and offerings of that grade are frequent in Steel Recovery Section lists of frozen stocks, some of which is being converted.

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Designs are based upon years of experience with air receivers and pressure vessels of all types. They are built to required codes of construction by experienced craftsmen, employing modern manufacturing methods and equipment. Rigid tests and inspections check every step of manufacture.

SCAIFE COMPANY

Bars . . .

Bar Prices, Page 138

Deliveries on light and medium carbon bars are tightening, one large producer reporting that some of its units are booked up for 60 to 90 per cent of third quarter capacity on these sizes. Cold-drawn bars are not generally available before August and little hot-rolled alloy material can be promised sooner. Consumers already are beginning to feel the effect of the ruling prohibiting shipment of heat treated bars to warehouses, beyond orders already in process. Jobber stocks of this material are spotty and some consumers have been forced to buy annealed bars and have them further treated, which has not worked well in most instances, facilities for this work being limited. The matter of additional cost is another factor.

Demand for cold-drawn bars appears less active in some areas, although requirements of the aviation industry are being well sustained and there is active buying of 7/16-inch bessemer billet core steel and also for 2¼-inch bessemer bars for fire control components. Machine tool demand for bars has tapered somewhat and there is less buying by builders of combat tanks and gun mounts.

Plates . . .

Plate Prices, Page 139

While some plate mills approached the deadline for June rollings without full capacity covered by consumer applications, allocations filled the gap, as had been expected, tonnage from mills having an excess of demand being redistributed. The general pattern of plate demand for June showed little change in most cases. In some instances less armor plate for tanks was needed and on the average it appears more tonnage was bought for railroad maintenance. On the whole variations were not sharp.

Requirements for synthetic rubber plants continue to dwindle and while a new program has been expected the recent controversy in Washington has upset speculation for the present. The outlook as to high-test gasoline refinery construction also has been beclouded but some well informed interests expect inauguration by midsummer of a new program on a scale at least two-thirds the size of that now closing.

Wire . . .

Wire Prices, Page 139

Forward buying of wire specialties is developing under CMP, orders for delivery during first and second quarters next year covering material required for long-range programs, current demand for which is heavy, with the likelihood of increasing, notably for aircraft, spring and valve wires. Incoming volume is in excess of shipments, with heat-treat-

ing and annealing departments, operating seven days per week, limiting production of numerous specialties. Demand for music wire is heavy, but with easing in lend-lease, producers have been able to make progress against domestic requirements.

High carbon low alloy bullet core steel production is heavy, but there are rumors of a possible cutback; to date, however, output is unabated. Substantial demand holds for oil tempered wire and rope mill requirements continue heavy. In some products mills are improving deliveries, mainly on items which have lagged for some time, including flat, shaped and coarser carbon wire. Most fine wire specialty departments are filled for months on what might be classified as duration contracts. Some overall tonnage wanted for second quarter will go over into the third, due to late orders with proper allotment numbers, making it impossible to fit the tonnage into operating schedules.

Contracts for screws for the Navy, totaling $562,776 under schedule 2888 opened several weeks ago, have been divided about equally between Reed & Prince Mfg. Co., Worcester, Mass., and Pheoll Mfg. Co., Chicago, while awards against later openings went to Elco Tool & Screw Corp., Rockford, Ill. Producers of screws and other small fastenings are heavy consumers of wire; some makers finishing wire from rods have drawing capacity overtaxed and are buying more finished wire.

Efforts to eliminate cross-hauling is affecting usual sources of wire rod supply with more consumers, under mild pressure to purchase from nearest mills. Rod inventories are kept down by spreading available tonnage each month over a wide range of users. Finishing schedules of the larger integrated mills are based on what is left after covering numerous non-producers. Demand for finer gage semifinished is heavy, notably for wire entering into camouflage material. Many ordinarily fabricating poultry netting and other light goods are heavily engaged on camouflage products.

Tin Plate . . .

Tin Plate Prices, Page 139

Several electrolytic tinning lines are now nearing completion, and in at least two cases tin plate is being produced. Undoubtedly some of this plate will be moved against June and July shipping orders, and in all probability electrolytic plate will make up a substantial proportion of third-quarter shipments.

Currently operations on hot-dipped plate are moving up to meet the influx of new tin plate orders under the Controlled Materials Plan. The increase is running much as had been mapped in advance and is following the lean margin as established by the War Production Board but will probably be adequate to meet all canning demands, barring unusual factors not now apparent.

Canners are still trying to get larger stocks of tin plate but there now appears to be little hope for success. The general policy will continue to be plate where it is needed as it is needed, with the emphasis on adequate deliveries, rather than adequate stock piles.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 139

Although some restrictions on use of concrete reinforcing bars have been lifted, quota limitations on production of new billet materials tend to balance slack demand and distributors have difficulty getting replacements and rounding out sizes. Demand is concentrated in a few larger projects; concrete barges and oil tanks require large tonnages, also a pier project in Panama. The largest current inquiry is for 8000 tons for floating concrete dry docks. Substantial part of the buying is handled direct by mills; activity with distributors is light with some scattered shading. Off heat semifinished, normally going to reinforcing bar mills, is withheld and goes into scrap in most instances.

Structural Shapes . . .

Structural Shape Prices, Page 139

Neither inquiry nor pending projects confront the structural steel fabricating trade. With almost a total absence of building construction, shops are active in shipping against old orders, and in handling subcontracts for war goods, these consisting of shipwork principally. Even for small lots of a few hundred tons, bidders will total eight or nine, indicating the intensity of competition.

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Pig Iron . . .

Pig Iron Prices, Page 140

Volume of pig iron produced in the Pittsburgh district during the remainder of 1943 will depend to a considerable degree on ability to maintain furnaces in operation. Continued production at high rate is taking toll of furnace linings and at least 10 per cent of the stacks in the Pittsburgh district must undergo repairs this year. Two stacks are already down for repairs and several others are running on borrowed time. This factor, probably more than supply of raw materials, will be the measure of pig iron production. Although raw material supplies are tight in some cases, there has been no acute shortage.

The trend toward increased use of turnings in the blast furnace continues. Increasing tonnage of turnings is becoming available at prices which permit economical use if alloy recovery is considered and if the pig iron can be used with its alloy content intact.

Few contracts for castings are now sublet in New England by machine builders operating foundries; work is more concentrated in their own shops. This is slowing down some jobbing foundries, whose pig iron requirements are less. At the peak of pressure for machine tools considerable tonnage for castings was subcontracted, but this has been steadily declining in recent weeks.

Malleable shops are well filled and demand for that grade is maintained. Melt of basic by steelworks is little changed from month to month. One factor in the continued active demand for malleable is the higher tensile strength and other improvement in castings made by these foundries. Malleable castings are frequently used where steel was considered the only answer previously. Stove and heating equipment foundries, notably the former, have not as a rule shared as heavily in war orders as some branches of the industry, but with restrictions partially lifted, a mounting increase in pig iron requirements is expectted to develop, starting with June. This, plus some scattered increase for heavy gray iron castings for shipyards, will partially offset the gradual decline in demand for foundry grades within the next two months.

Scrap . . .

Scrap Prices, Page 142

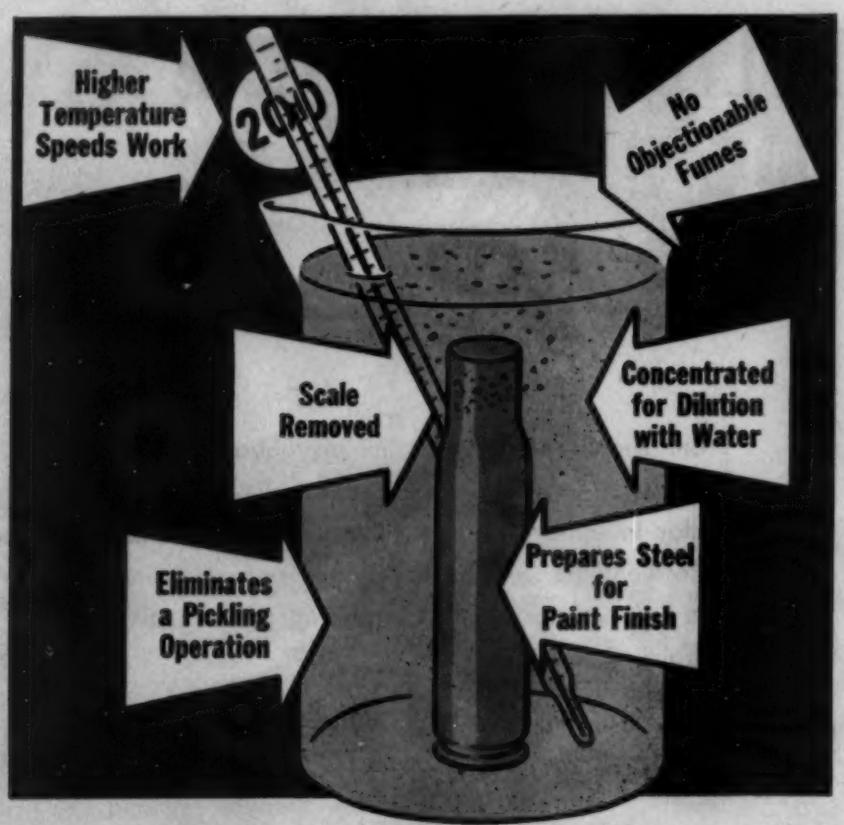
In general, conditions in the steel and iron scrap market are dull, contrasting sharply with a year ago. Supply is coming out in sufficient quantities to meet needs of consumers and the latter are more particular in accepting offerings. Heavier grades move freely but dealers and producers find difficulty in moving lighter and inferior material. While public appeals for scrap are not being made in the same degree as last year government agencies are active in obtaining dormant scrap from every possible source and machinery for this purpose is functioning smoothly.

Lack of manpower in yards continues to hamper preparation, even under increased rates of pay allowed in some localities.

Moderate betterment in quantity and quality of scrap is noted in the St. Louis district, more agricultural and railroad material lifting the average. Bundled grades are in excess supply. Predictions are made that dealer shipments will decline after June 1, due to labor shortage and smaller supplies from all sources. Allocation of more remote material to fill the gap will meet opposition because of high freight cost.

Allocated tonnages of No. 2 heavy melting bundles arriving in the Buffalo district have relieved the situation somewhat as to machine shop turnings, providing a larger proportion of heavy material to be used with the lighter turnings. An important melter has raised its embargo for some local dealers. Shrinkage of tin can pickup by almost half is blamed on food rationing.

Quality of open hearth grades of scrap in New England is better, with strictly No. 1 heavy melting moving about as fast as produced, some by allocation. No. 2 and bundles, however, make up a substantial part of the tonnage moved by allocation, frequently to other districts. More light scrap for bundles is reaching yards from remote areas, tonnage which has been immobilized by weather. Blast furnaces are buying mixed borings and short turnings and stove plate in small sizes, but alloys of uncertain content and bushy machine shop turnings are piling up. Demand for foundry grades is slack; some foundries are melting less and most shops



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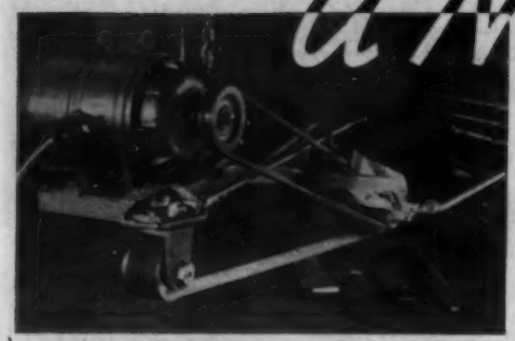

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TO SPEED DELIVERIES REED PRODUCES THESE FOUR TYPES OF MICROMETERS

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have substantial inventories, including the busier malleable group.

Industrial concerns in the New York-New Jersey district salvaged a record tonnage of steel and iron scrap in the period from March 20 to April 20 with 134,934 net tons. Plants reporting to the regional salvage manager totaled 4173. In addition these plants salvaged 14,700 tons of nonferrous scrap. The best previous record was 133,435 tons of steel and iron in the period from Jan. 20 to Feb. 20.

During the past 12 months 74,737 tons of steel and iron scrap has been gathered in the St. Louis area by the Special Projects Salvage Division of WPB. In this period 1768 projects have been found and all but 420 have been completely salvaged. They include abandoned mines, tanks and boilers, unused smokestacks, street car rails, river barges and others.

Metallurgical Coke . . .

Coke Prices, Page 139

Following a relatively light week in the Connellsville region, due to coal mine shutdowns, beehive ovens picked up as miners returned to work. The intervening lag, however, was enough to cause serious aggravation of an already tight supply situation and it is probable that pressure will continue in such force that it will be difficult to build up stocks as a cushion against further interruptions in output.

The coke industry has not recovered from the coal strike in April, 1941. At the giant Clairton coke works, for example, unceasing efforts have been able to build up a stock pile of only 300,000 tons, whereas normal stocks before the captive mine strike were about 1,000,000 tons. Because of the heavy demand coal has been coked almost as fast as it could be delivered to ovens.

Iron Ore . . .

Iron Ore Prices, Page 141

Iron ore movement on the Great Lakes got under way April 24, when first ships reached Lake Superior ports. During April shipments totaled 1,954,817 gross tons. This is 5,902,289 tons less than was moved in April, 1942. The season total to May 1 is 6,694,891 tons less than was moved to that date last year. The decrease for April was 75.12 per cent and for the season 77.40 per cent.

Details for April movement are as follows:

	April, 1943	April, 1942
Escanaba	580,185	695,007
Marquette	43,124	574,885
Ashland	196,203	789,312
Superior	412,071	2,603,385
Duluth	369,246	1,753,005
Two Harbors	353,988	1,373,588
Total U. S. ports	1,954,817	7,789,182
Michipicoten	.....	67,924
Grand total	1,954,817	7,857,106
Decrease from year ago	5,902,289	

Comparisons of shipments to May 1 in 1943 and 1942 are as follows:

	To May 1, 1943	To May 1, 1942
Escanaba	580,185	771,291
Marquette	43,124	700,574
Ashland	196,203	818,529
Superior	412,071	2,920,141
Duluth	369,246	1,861,566
Two Harbors	353,988	1,509,683
Total U. S. Ports	1,954,817	8,581,784
Michipicoten	.....	67,924
Grand total	1,954,817	8,649,708
Decrease from year ago	6,694,891	

Warehouse . . .

Warehouse Prices, Page 141

To meet a strong demand, steel warehouses in the East have better balanced and larger stocks of most hot-rolled carbon products. Inventories of cold-finished rounds in a greater range of sizes are also heavier, replacement of flats being less pronounced. Demand for structurals and plates out of warehouse by shipyards is more active. Fill-in requirements for plates are substantial, and, although mill deliveries to jobbers have been somewhat heavier in spots, tonnage moves briskly.

While a few warehouses have tie-ups with heat-treating shops, the elimination of deliveries of normalized and heat-treated steel to jobbers will halt some fill-in buying from distributors. The 30 cents per 100 pounds extra for heat treating allowed jobbers will not tend to stimulate buying of as-rolled material by the jobber for normalizing outside, the extra being too small to make this profitable.

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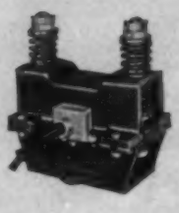

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MAKERS OF ALL TYPES OF GEARS AND GEAR REDUCERS

Nonferrous Metals . . .

Nonferrous Prices, Page 148

New York — More than 1,000,000 tons of copper products have been allotted 14 claimant agencies for the third quarter by the Requirements Committee, WPB. Demand for copper and other controlled materials continues in excess of supplies, as indicated by tentative allocations which were reduced 23 per cent from original requests. Approximately 330,000 tons of aluminum were allotted.

While limitation orders restricting the use of copper in more products are issued weekly, requirements of fabricators producing materials under war contracts are maintained, but civilian and less essential needs are kept to a minimum.

Under the premium price program additional premiums are allowed small copper mines which produced less than 2000 tons in 1942; some need higher revenue for increased production. The premium will be paid for tonnage in excess of the special quotas allotted small mines, each case to be considered individually by the Metals Reserve Co. At least one producer has asked for a downward revision of its monthly quota to enable the company to move a larger part of output at the five cent per pound premium.

With completion of a new power plant in October, output of the Utah mine of the Kennecott Copper Corp. will be increased. Expansion has been delayed six months by inability to obtain some material. E. T. Stannard, president, told stockholders last week production at Kennecott mines is setting new highs. Labor pinch is tightening at both mines and fabricating plants.

Prices of die castings have been frozen at their lowest levels between April 1, 1942 and April 30, 1943. OPA issued this regulation to avoid an increase; sales last year reached $90,000,000. For a large number of war uses, die-castings are now mostly of aluminum and magnesium. This contrasts with pre-war demand when die-castings were largely of zinc. Production of zinc die-castings has declined sharply and last year represented only 35 per cent of the total.

Discounts from base on plain extruded forging alloys in the rod list are raised to ½-cent per pound in a new list of base prices issued by Revere Copper & Brass Co. Inc. The discount has been ¼-cent; approximately 12 alloys are affected, some heavy tonnage items. In the quantity schedule as applying to seamless tubes, all quantities under 100 pounds and under three inch o.d., the extras have been reduced by half.

After June 30, WPB will end the schedule of prices paid for idle aluminum and will direct such material into normal scrap channels; this will also apply to non-usable aluminum reported after June 30 by holders of stagnant inventories. To report monthly shipments and unfilled orders of aluminum ingots, form CMP-23 will be used by primary producers and secondary smelters of aluminum.

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Firth-Sterling Gives 10% War Discount on Firthite

Firth-Sterling Steel Co., McKeesport, Pa., has instituted a special 1943 war discount on Firthite sintered carbides, effective for the remainder of this year. It applies to all forms of Firthite, including tips and blanks, milled-and-brazed tools, general purpose tools, standard and special tools. The discount is being made effective on all unfilled orders and on current invoices and quotations for Firthite.

The company announces this discount as a contribution toward winning the war and combating inflation.

Steel in Europe . . .

London—(*By Cable*)—Extended bookings of plates, angles and light structurals have been taken by mills in Great Britain. Substantial specifications are being received for steel for tanks, freight cars, locomotives and colliery equipment. Demand for tin plate is light.

Lake Coal Dealers May Adjust Prices to Costs

Dealers in lake cargo coal other than those on the United States side of Lake Superior and the west bank of Lake Michigan may adjust their maximum prices to reflect coal cost increases in the same way as other dealers, OPA has ruled.

This adjustment, involving the addition

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In steel mills, coal yards, shipyards, railroads and other war plants all over America, I. B. Cranes are working night and day moving heavy materials, getting things done in a hurry. I. B. Cranes are doing their jobs continuously—seldom if ever requiring time out for repairs. They're powerful—handling the tough jobs with ease. They're efficient—they get more work out of a gallon of precious fuel oil than rightfully could be expected. If you're interested in speeding up your share in America's war effort, I. B. Cranes can help you. Write to Industrial Brownhoist Corporation, Bay City, Michigan. District offices: New York, Philadelphia, Pittsburg, Cleveland, Chicago.

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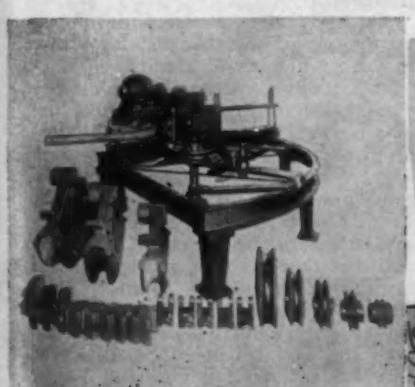

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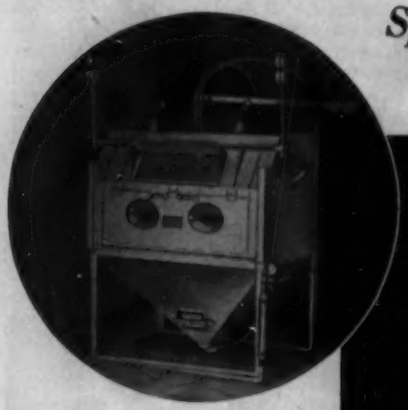

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Write for Bulletin WP 22.

CULLEN-FRIESTEDT CO.,
1308 S. KILBOURN AVE. CHICAGO, ILLINOIS

to highest December, 1941, selling prices of the lake cargo coal dealers of the increases in their supplier's maximum prices for the same coal over the last 1941 cost to the dealer, is provided for in Amendment No. 4 to Revised Maximum Price Regulation No. 122, solid fuels sold and delivered by dealers, effective April 28, 1943.

Hitherto these lake coal dealers have been selling at their December, 1941, circular prices. The increases now to be added will vary from dealer to dealer because of variation in their individual purchase costs.

Canada . . .

Toronto, Ont. — Iron and steel buying continues at good volume despite heavy demand of the past six weeks, which has absorbed practically all output of domestic mills to the end of this quarter. Shipbuilding is the dominating feature of the war program and recent steel placements on this account, both to Canadian and United States producers, have totaled record tonnages. In some other branches of war industry, however, steel demand has tapered and according to recent reports from government circles further curtailment may be expected for third quarter.

Plate mills in the Hamilton and Sydney districts have been maintaining production well above rated capacity and officials of the various producing companies report demand far in excess of output. The new frigate construction program calls for heavier plate than that used in corvettes or mine-sweepers, resulting in increased output of the heavier types and reduction in lighter gages.

Canadian mills are carrying large backlogs on carbon and alloy bars and practically all production for the current quarter is on order. Demand continues heavy and there is a large outpouring of small lot orders from essential civilian consumers. War contractors also are maintaining a steady flow of new buying in an endeavor to establish inventories. In a few spots temporary shortages of special bars were reported but most war consumers are being supplied under instructions from the steel controller. Some domestic mills have found it necessary to suspend production of reinforcing bars in order to provide enough steel for other urgent production.

Wire and wire products developed more interest during the past few days, with a large number of inquiries appearing from farming communities for fencing and other repair work. Most of the heavy buying, however, is from industrial plants and mills find difficulty in filling orders, owing to reduced operating schedules through lack of wire rods.

Local dealers reported further betterment in steel scrap receipts and some stated that they are now receiving small quantities from outside points. New offerings from automobile wreckers also were reported, but volume from this source still is far below normal. War plants are maintaining constant supply of scrap, chiefly in turnings, borings and clippings, most of which is going direct to electric furnaces.

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NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-90: Multiple-spindle automatic screw machine work for machines having 2¼-inch diameter bar capacity. Material, SAE-1020 cold-rolled tubing, supplied by prime contractor. Moderate tolerances. Time of four machines required 168 hours per week for at least three months. Reference, 1-A-912.

SC-91: Single or multiple-spindle automatic screw machine work for machines having ¾-inch diameter bar capacity. Four items. Material, half-hard brass for three items and WDX1314 steel for one item. Tolerances, .002 to .005-inch. Quantity, 200,000 each item. Rating AA-1. Reference, 1-F-653.

SC-92: Forging facilities of 500-ton capacity or over, suitable for shaping 16-inch square billets or 13 x 19-inch slabs to round billets from 17 to 19-inch diameter. Material, SAE 2030 steel, supplied by prime contractor if desired. Unit weight approximately 300 pounds. Rating, AA-1. Continuous production. Reference, 1-A-913.

SC-89: Single-spindle automatic screw machine work for machines having 2 5/16-inch diameter bar capacity. Material, cold-rolled steel and AISI C1118, supplied by prime contractor. Minimum tolerance, plus or minus .002. Rating, AA-1. Quantity, about 90,000, with 4000 delivered in May, increasing to 15,000 during December, 1943, to coincide with availability of material. Reference, 1-A881.

Minneapolis Office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

No. S-324: Hydraulic pump parts. Quantity, 500 to 1000 each of several parts, with probably larger quantities later. Deliveries must start soon. Bronze and gray iron castings and forgings will be furnished by prime. Tolerance, .0002. Operations are machining, grinding, milling and lapping. Vendors to Twin City Ordnance can handle these.

No. S-421: Adjustor screws. An automatic screw machine job. Two sizes, 7/32 and 11/32-inch in length by approximately 3/16-inch diameter. No. 40 thread. Quantities are large, with deliveries up to 1,000,000 monthly, not less than 25,000 per week from any one plant. Tolerance, .010. Material, 3.16-inch cold-rolled steel. Priority, AA-1.

No. S-419: Shaft and check nuts. Shaft is ¼ x 5 inches. Two small check nuts, one right and one left-hand thread. Quantity, 1000 of each, with delivery urgent because of subsequent production. Job calls for bench lathes. Tolerance, .0015. Material, brass and aluminum alloy. Priority, AA-1.

No. S-420: Small bomb control parts. Five small parts, 1000 wanted of each. Operations are machining (lathe), thread cutting, grinding, etc. Tolerances as close as .0005 on some items. Material is steel, which may be furnished by prime. Early delivery urgent because of subsequent production.

No. S-407: Aircraft engine parts. Pennsylvania aircraft manufacturer seeks subcontractor in this area for finishing 4600 pistons and 7600 cylinder barrels per month. Steel forgings for cylinder barrels and aluminum alloy castings for pistons will be furnished. Operations include machining, grinding, drilling, etc. Tolerances mainly .002 to .005, though one of two are finer.

No. S-403: Shackle bolts with grease hole and groove. Lengths, 3¾, 4, 4½, 5, 5¾ and 6 inches. Diameter, ⅞-inch. 14 USF threads per inch. Quantities, 250 to 5000 of each size. Early delivery. Commercial tolerances. Material, SAE 1020 or X-1020.

No. S-417: Valve seats and sleeves. These are small parts (O.D. .319, length .655) wanted by Cleveland prime. Quantities, 5000 to 10 000. Require precision lathes and external grinders. Tolerances call for concentricity within .00025. Material is No. 416 free-cutting stainless steel. ⅝-inch diameter, which prime will furnish if necessary.

No. S-418: Local prime contractor seeks open time on circular shear to handle 16-gage steel.

No. S-440: Bushings for Wright aircraft engine. Parts 19D16 and ST19D16. Operations are machining, tapping and threading, the threading to be done after heat treating. Quantities indefinite. Tolerance, .0003. Material, AMS 5610. Priority, AA-1.

No. S-442: Bronze aircraft parts. Ten parts, various sizes. Calls for brass foundry and machine shop with No. 4 Warner & Swasey or equal. Quantities either 21,000 or 42,000 of each item with deliveries either 4000 or 8000 per month. Material is Naval brass and manganese bronze. Tolerance, .001. Priority, AA-1, with Navy allotment number. Prompt action needed.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building reports the following subcontract opportunities:

Buescher-16-9: A government agency requires 599 accessory drive gears. Deliveries, 60 per month, starting in June. Dimensions, spur gear 4.571-inch P.D., 20-degree stub tooth form, 32 teeth 7/9 pitch: width 11/32-inch. Tolerance, .002 to .006, when rolling with mating master gear. Surfaces and P.D. of gear to be concentric, parallel, flat and true within .0005-inch full indicator reading. Rockwell C47-51. All material will be furnished.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 5928: Cast track rollers. Quantity, 1000 per day. Castings furnished. Equipment, vertical boring mill, turret lathe or lathe, high-duty drill, tapper. Dimensions, 9 inches O.D. x 9 inches long. Tolerance, plus or minus .0005.

Job No. 5984: Seat back bracket. Quantity, 5000. Material, WD-1085 steel, which is furnished. Equipment, cutoff shear, punch press, heavy-duty brake, heat treat. Dimensions, 27⅝ inches long. Tolerance, plus or minus .015.

Job No. 5985: Gunner's seat shaft. Quantity, 5000. Material, SAE-1020 steel. Equipment, hand screw machine, bolt threader with lead screw, snag grinder, cadmium plate. Dimensions, 1⅛-inch O.D. x 9⅝ inches long. Tolerance, plus or minus .0062.

Job No. 6138: Sleeve. Quantity, 100,000. Steel tubing furnished. Equipment, automatic screw machine, hand mill. Dimensions, 2⅛-inch O.D. x 1¾-inch long. Tolerance, minus .003.

Job No. 6134: Barrel. Quantity, 2000. Material, steel. Equipment, hand screw machine, tapper, parkerizing, lubrizing. Dimensions, ⅝-inch hex x 3 inches long. Tolerance, plus or minus .0013.

Job No. 5839: Disc retainer. Quantity, 11,000. Material, monel rod, which is furnished. Equipment, hand screw machine. Dimensions, 1⅛-inch O.D. x 5/32-inch long. Tolerance, plus .0005.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-17-22359: New York City prime contractor requires immediate subcontracting facilities for machining aircraft wrenches. Steel forgings furnished by prime contractor, requiring milling and boring operations. Size of castings, 6 inches long by 2¼ inches wide. Quantity, 150 per month for eight months.

S-17-22286: New York City prime contractor seeks subcontracting facilities to machine, finish and assemble alligator action ear forceps. Forgings furnished by prime. Samples at New York office. Quantity, 900. Tolerance, commercial.

S-17-22336: New Jersey manufacturer seeks subcontractor with gear cutting facilities, to make gears. Equipment, spiral and bevel cutting machines, gear grinding and gear lapping machines, engine and turret lathes and horizontal broaching machine. Material, AMS 2640, SAE 2330. Tolerance, .002. Dimensions, 1 to 4 inches. Quantity, 1000 per month. Prints available.

S-17-22335: Long Island City manufacturer seeks subcontractor to make 10,000 steel castings, 3¼-inch wide x 2⅝ inches high. Matched plate pattern not furnished.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

4000 tons, railroad bridges, United States Army, to Mississippi Valley Structural Steel Co., Decatur, Ill.

1800 tons, modification building, Douglas Aircraft Co. Inc., Tulsa, Okla., to Patterson Steel Co., Tulsa, Okla., and Tulsa Boiler & Machinery Co., Tulsa, Okla.

1800 tons, modification building, Douglas Aircraft Co. Inc., Oklahoma City, Okla., to Robberson Steel Co., Oklahoma City, Okla.,

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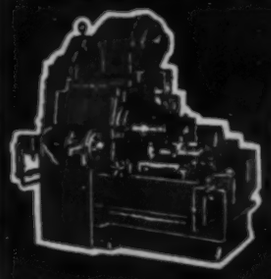

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REINFORCING STEEL PLACED

250 tons, packing plant addition, Wilson & Co., Cedar Rapids, Iowa, to Concrete Steel Co., Chicago; Sumner S. Sollitt & Co., Chicago, contractor; bids April 19.

Equipment . . .

New York — Machine tool buying is confined for the most part to orders for one to three units. Larger purchases for complete tooling of new plants are few; an exception includes contracts for a new shipyard in New Jersey. Shipments are holding, deliveries improving and backlogs declining. While some units are still tight, notably larger-sized automatic screw machines, most standard tools are easier.

A fair part of current deliveries is destined for aircraft production, direct or to subcontractors. Considerable individual buying would follow any relaxation in regulations covering equipment purchases. Numerous fabricators, who have been unable to buy because of restrictions, would now order some replacements with prospects for better delivery. Some of these shops are borderline units doing some war work with older and less efficient machines.

Demand for machine cutting parts and attachments is unabated and actually increasing, with deliveries extended six months or longer on cutters and some high speed steel units. This load results from recurring replacement for the many thousands of machines now operated around the clock rather than primary requirements for original tools. Government procurement offices are frequently splitting large contracts for cutters, reamers, taps, broaches and other parts among several shops and awarding more volume on a delivery basis regardless of quotations in open bids.

CONSTRUCTION AND ENTERPRISE

OHIO

CLEVELAND—Jack & Heintz Inc., Wm. Jack, president, H. E. Stremple, construction superintendent, Solon road, Bedford, O., is erecting four new factory buildings at Broadway road, Maple Heights, and Solon road, Bedford. Group includes chemical storage and plating building, one story, 41 x 113 feet; one unloading dock and changing monorail system; one scrap bin, one-story, 31 x 74 feet, and one-story, 30 x 112-foot crate carton and storage building. Estimated cost, $75,000.

CLEVELAND—Maurath Inc., G. H. Maurath, president, 7309 Union avenue, will build one-story, 120 x 260-foot factory and office building to cost $100,000. H. M. Morse Co., 1500 East Superior avenue, engineer.

CLEVELAND—Hickok Electrical Instrument Co., Robert D. Hickok, president, 10515 Dupont avenue, will build two-story, 20 x 94-foot factory addition when priorities are received. Cost is $20,000.

CLEVELAND—S. K. Wellman Co., 1374 East Fifty-first street, has contract authorized by Defense Plant Corp., Washington, to provide equipment for plant in Ohio at cost of $269,000. Exact location and type of plant not known.

MASSILLON, O.—Canton Drop Forging & Mfg. Co., C. A. Brauchler, president, 207 Twelfth street, Canton, will build forging mill.

MASSACHUSETTS

EAST BOSTON, MASS.—Mystic Steamship division, Eastern Gas Fuel Corp., F. B. Craven, manager, and Lewis Wharf, Boston, will let contracts for one-story, 97 x 153-foot two ells, 30 x 153 and 20 x 55 feet, one story, 25 x 55 feet, machine shop, carpenter shop and fabricating unit, also one-story, 32 x 70-foot office building. Cost is $155,000. Waghorne-Browne Co., 44 School street, Boston, architects.

SPRINGFIELD, MASS.—Hampden Brass Co., 252 Liberty street, will construct one-story, 65 x 242-foot cinder block foundry to cost over $40,000. M. W. Maloney, 220 Dwight street, architect. Owner builds.

CONNECTICUT

ANSONIA, CONN.—Ansonia Electric Co., 63 Main street, will build one-story, 65 x 100-foot brick and steel utility building, Main street. Fletcher Thompson Inc., 211 State street, engineer. Estimated cost, $40,000.

BRIDGEPORT, CONN.—Bridgeport Brass Co., 30 Grand street, will build factory to cost over $40,000. Fletcher Thompson Inc., 211 State street, engineer.

WATERBURY, CONN.—Scoville Mfg. Co., 99 Mill street, will build one-story, 200 x 300-foot factory. Plans by Turner Construction Co., 30 Newbury street, Boston. Estimated cost, $200,000.

NEW JERSEY

ORANGE—Orange Roller Bearing Co., 557 Main street, have plans by W. Wands, 309 Bloomfield avenue, Caldwell, N. J., for one-story storage building to cost $40,000.

PENNSYLVANIA

PITTSBURGH—Carnegie-Illinois Steel Corp., Carnegie building, will build addition to metallurgical laboratory, Woods Works, McKeesport, Allegheny county, Pa. George H. Chilli, First National Bank building, Homestead, Pa., contractor.

MICHIGAN

DEARBORN, MICH.—Ford Motor Co. is planning construction of aircraft engine test building, extension No. 3, at Rouge plant.

DETROIT—Plymouth Steel Co., 6134 Epworth avenue, will build factory addition. W. E. Wood Co., 4649 Humboldt avenue, contractors. Sub-trade contracts postponed pending adequate priority rating.

DETROIT — Frederic B. Stevens Inc., 510 Third avenue, will remodel building and install new laboratory. H. Augustus O'Dell, Donovan building, architect.

DETROIT—Abrasive Dressing Tool Co., 1550 Broadway, will remodel plant at 14528 Second avenue. Charles N. Agree, 1140 Book building, architect.

DETROIT—Willey's Carbide Tool Co., 1340 West Vernor Highway, will construct plant addition. Charles N. Agree, 1140 Book building, architect.

DETROIT—Gordon Products Co., 1011 Transportation building, has been incorporated with $50,000 to manufacture chemical products. Harry Lataner, 1010 Transportation building, correspondent.

ILLINOIS

CHICAGO—Person Construction Co., 130 North Wells street, has contracts for hemp mills in the vicinity of Fithian, Galesburg, Galva, Lexington, Minonk and Wyoming, Ill., to cost $589,000.

ROCKFORD, ILL.—Sjostrom & Sons have contracts for hemp mills at Earlville, Ladd, Kirkland and Shabbona, Ill., at total cost of $446,000,

SPRINGFIELD, ILL.—Commodity Credit Corp. has awarded contracts for construction of eight hemp mills in Illinois.

MARYLAND

BALTIMORE—Chemical & Pigments Co., 6401 St. Helena avenue, will construct boiler house to cost $40,000. Osborn Engineering Co., 7016 Euclid avenue, Cleveland, architects.

MIDDLE RIVER, MD.—Glenn L. Martin Co.,

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Paul E. Tignor, building engineer, has completed plans for warehouse to cost $201,000, one-story, 600 x 120 feet. Albert Kahn Inc., Detroit, architect.

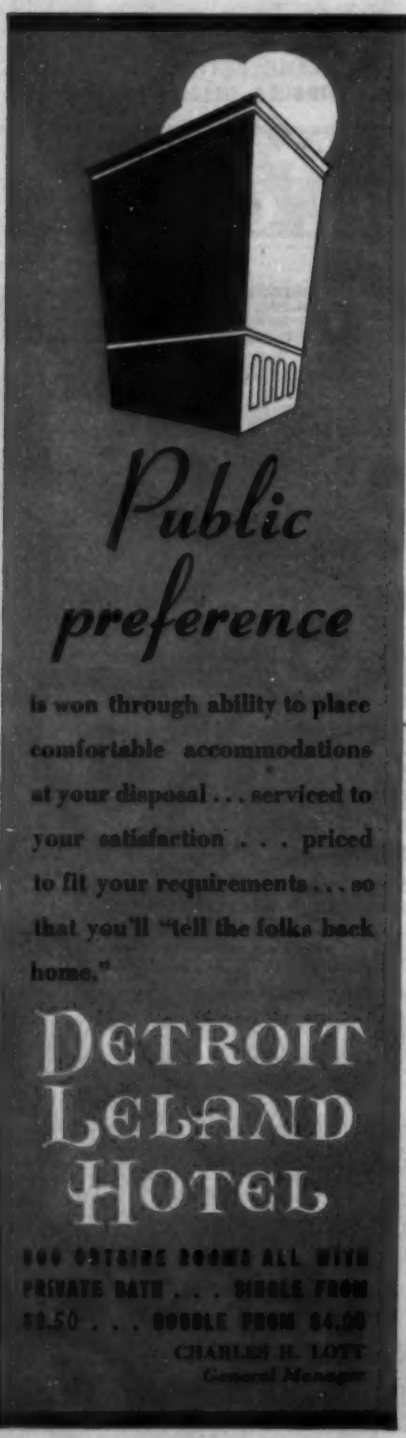
MISSOURI

ST. JOSEPH, MO.—Sharp & Dohme Inc. plans to spend $75,000 on improvements at its local plant. J. W. Jester, engineer.

ST. LOUIS—Wolff Pipe & Iron Co., 3727 Chouteau avenue has acquired additional site for erection of warehouse.

WISCONSIN

EAU CLAIRE, WIS.—White Machine Works has acquired plant of Wisconsin Refrigerator Co. to be converted into machine shop and other steel manufacturing use, enabling White Machine Works to increase present production eight or ten times.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WEST VIRGINIA

MARTINSBURG, W. VA.—Explosive Products Corp., Washington building, Washington, will build 18 buildings, including power house. Estimated cost is $2,000,000. Workmens Housing Corp., W. F. Bennett Jr., United Bank building, Cleveland, engineer.

CALIFORNIA

ALAMEDA, CALIF.—United Engineering Co., foot of Main street, will construct 70 x 200-foot warehouse addition. Younger Construction Co., Cheda buildings, San Anselmo, Calif., contractor.

LOS ANGELES—Aero Die Stamping Co., 617 East Fifty-sixth street, will erect 40 x 100-foot factory to cost $5000.

LOS ANGELES—Crellin Machine Co., 114 West Elmyra street, will build office and factory building, 50 x 100 feet, to cost $10,000.

LOS ANGELES—Aircraft Tools Inc., 530 Gage avenue, will erect new machine shop, 43 x 105 feet, to cost $7000.

LOS ANGELES—Federal Tool & Supply Co. is firm name under which Fred H. White and Cornelius M. Sexton have published intention to conduct business at 1625 South Hill street.

LOS ANGELES—Aero Magnetic Laboratories is firm name under which James Babcock and P. A. Robinson have published intention to conduct business at 4870 Santa Monica boulevard.

LOS ANGELES—R.L.E. Tool and Experimental is firm name under which Robert L. Fortner has published intention to conduct business at 718 West Wilson avenue, Glendale, Calif.

LOS ANGELES—Southern California Magnesium Inc., newly organized, will be represented by Hansen & Sweeney, 842 Title Insurance building. Directors are: Thomas Sheedy, 1201 El Vago street, La Canada, Calif.; George Sheedy, 4840 Hillard avenue, La Canada, Calif.; and T. D. O'Neil, 10544 Dunlear avenue, Los Angeles.

LOS ANGELES—Pioneer Steel Co., 311 West avenue Thirty-three, has been formed by Darwin C. Singletary and Joseph H. Wiserman.

LOS ANGELES—Lee Davis Precision Machine Works, 2135 West Manchester avenue, has been formed by Harry W. Lee and Charles F. Davis.

HAWTHORNE, CALIF.—Crozier Machine and Tool Co., 684 Prairie avenue, has been formed by H. E. Crozier and C. P. Crozier.

OREGON

PORTLAND—Pacific Chain & Mfg. Co., 1901 N. W. Wilson street, have plans by J. W. DeYoung, 730 S. W. Salmon street, for one-story 100 x 220-foot frame, cast steel foundry with two craneways. Cost is $200,000.

CANADA

WINNIPEG, MAN.—MacDonald Bros. Aircraft Ltd., 50 Robinson street, will build plant addition at Stevenson field,, Fraser, MacDonald & Co. Ltd., 911 Somerset boulevard, contractors. Estimated cost, with equipment, about $100,000.

BRANTFORD, ONT.—Waterous Ltd., Market street south, D. M. Waterous, manager, has had plans prepared and will let contracts for repairs and addition to foundry plant to cost, with equipment, about $30,000.

COLLINGWOOD, ONT.—Collingwood Shipyards Ltd., Huron street, will build plant addition for welding shop to cost $35,000. Bradford-Houhal Ltd., 1170 Yonge street, Toronto, general contractor; Frankel Bros. Ltd., Eastern avenue, Toronto, structural steel contractors.

DELORO, ONT.—Deloro Smelting & Refining Co. Ltd., R. A. Elliott, manager, will build plant addition to cost $27,500. M. Sullivan & Son Ltd., Arnprior, Ont., contractors.

GUELPH, ONT.—Guelph Spring & Axle Co. Ltd., Wellington street, has given general contract to J. D. Oaks, 365 Woolwich street, and work will be started immediately on plant addition 48 x 98 feet, to cost about $15,000. B. A. Jones, 15 King street west, Kitchener is architect.

HAMILTON, ONT.—Steel Co., of Canada Ltd., Wilcox street, has plans by Hutton & Souter, Pigott building, for construction of two-story, 50 x 50-foot chemical laboratory to cost $65,000 with equipment.

LONDON, ONT.—Canada Vulcanizer & Equipment Co. Ltd., 1109 York street, is having plans prepared for erection of plant addition to cost, with equipment, about $15,000.

HAMILTON, ONT.—International Harvester Co. of Canada Ltd., Sherman avenue north, has given general contract to W. C. Brennan Contracting Co. Ltd., 400 Gage avenue north, for construction of addition to armor plate machinery plant, one story, 64 x 80 feet, to cost about $25,000.

ST. CATHARINES, ONT.—Foster Wheeler Ltd., 81 Eastchester street, has given general contract to H. A. Wickett Co. Ltd., 156 Front street east, Toronto, for construction of pattern building, 40 x 60 feet, to cost about $15,000.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, has had plans prepared and will let contracts soon for further plant addition and installation of equipment to cost about $97,000.

TORONTO, ONT.—Toronto Shipbuilding Co. Ltd., Fleet street west, has given general contract to F. S. Milligan & Co., 378 Yonge street, and let number of sub-trades in connection with plant addition to cost, with equipment, about $60,000.

WELLAND, ONT.—Electro-Metallurgical Co. of Canada Ltd. has given general contract to Gardner Construction Co. Ltd., 7 Riverbank, for construction of plant addition at Crowland works to cost about $150,000.

WELLAND, ONT.—Atlas Steels Ltd. has given general contracts to Pigott Construction Co Ltd., Pigott Bldg., Hamilton, at $121,600 and to Standard Steel Construction Co. Ltd., Port Robinson, at $57,000 for construction of further additions to plant here. Prack & Prack, Pigott Bldg., Hamilton, are architects and engineers.

WELLAND, ONT.—Page-Hersey Tubes Ltd., 100 Church street, Toronto, Arthur McFadyen, general manager, has given general contract to Dickie Construction Co. Ltd., 17 Yorkville street, Toronto, for construction of plant addition at Crowland near here, to cost about $30,000. Margison and Babcock, 210 Dundas street west, Toronto, consulting engineers.

WOODSTOCK, ONT.—Truck Engineering Ltd. 165 Wellington street south, Vernon King, manager, has given general contract to James A. Vance, 288 Light street, for construction of plant addition on Henry street, 54 x 70 feet, to cost, with equipment, about $30,000.

MONTREAL, QUE.—Ayerst, McKenna & Harrison Ltd., 485 McGill street plan to construct laboratory plant buildings to cost, with equipment, $240,000.

MONTREAL, QUE.—Johnson Wire Works Ltd., 4760 Dagenois street, plan two-story, 20 x 100-foot plant addition. J. Pringle Ltd., 485 McGill street, engineer.

MONTREAL, QUE. — Keating Forging & Foundry Co. Ltd., 335 Bourgeois street, will build steel, brick plant, Island street. E. Barabe, 1274 St. Elizabeth street, contractor. Estimated cost, $70,000.

STE. THERESE, QUE.—Commonwealth Plywood Co. Ltd., is receiving tenders through Nobbs & Hyde, architects, 1240 Union avenue, Montreal, for construction of plant addition and installation of equipment to cost about $40,000.

VALLEYFIELD, QUE. — Canadian Bronze Powder Ltd., 9 East Park street, will rebuild sections of plant at cost of $80,000.

VANCOUVER, B. C.—Pacific American Steel & Iron Corp., Everett, Wash., will construct 100,000-ton per year steel mill.

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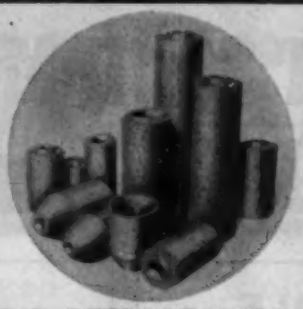

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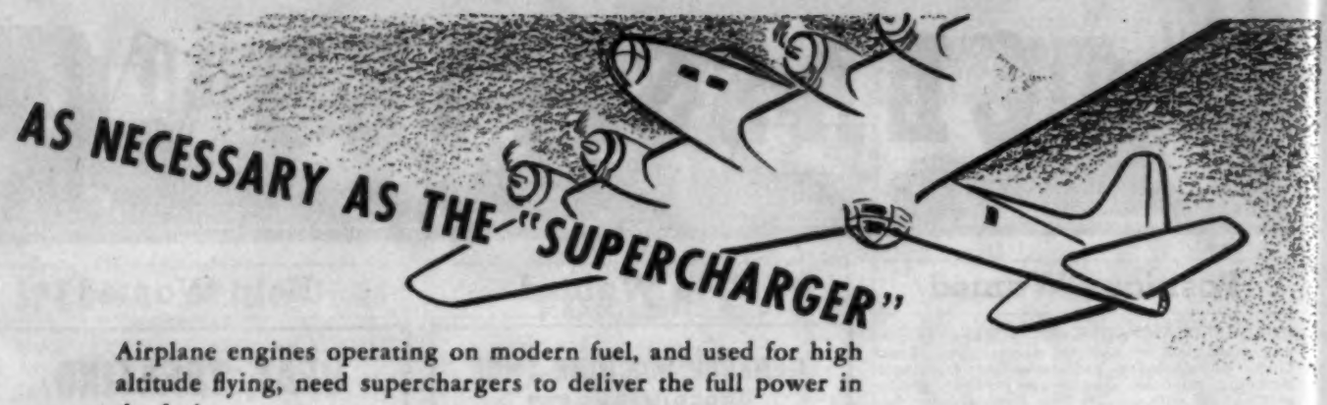

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For 25 years you have been installing Cleveland Worm Gear Speed Reducers successfully on your toughest jobs, knowing they will take punishment in their stride and come up smiling. Clevelands stand the gaff—require but nominal maintenance—with no parts replacements for years on end.

The Cleveland Worm & Gear Company • 3270 East 80th Street, Cleveland, Ohio

Affiliate: The Farval Corporation, Centralized Systems of Lubrication

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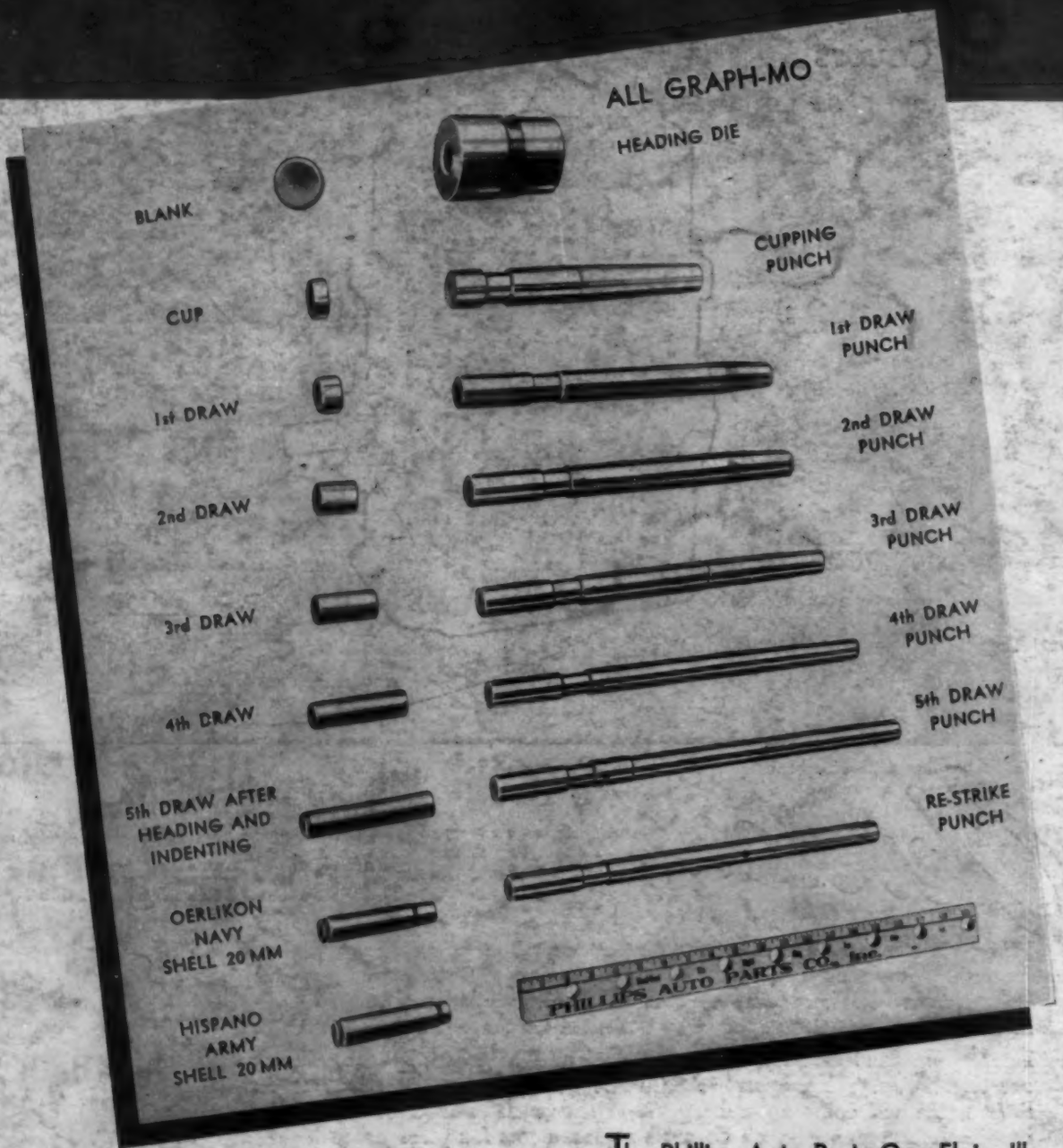
CLEVELAND WORM GEAR *Speed Reducers*

"Graphitic Steel machines more easily than other steels we have used," *says Cartridge Punch Manufacturer*



The Phillips Auto Parts Co., Elgin, Ill., uses Timken Graph-Mo Steel in the manufacture of cartridge punches. Says Mr. Phillips: "This steel machines more easily than other steels we have used and is less subject to distortion. Our men like to work with it."

Many other producers of munitions and munition dies and tools are using Graph-Mo Steel for these same reasons.

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TRADE-MARK REG. U. S. PAT. OFF.
GRAPHITIC STEELS

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TECHNOLOGY DEPT:

Section Two

May 10, 1943

PRIORITIES ALLOCATIONS PRICES

INCLUDING CMP REGULATIONS

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This guide on WPB and OPA regulations has been compiled by the editors of STEEL as a handy reference and instruction book for the metalworking and metalproducing industries. Readers should consult regular issues of STEEL for changes and revisions which are reported each week.

STEEL

Penton Building
CLEVELAND, OHIO

REVISED AS OF MAY 4, 1943

Digest of

Controlled Materials Plan

Controlled Materials Plan has attained its position as the dominant instrument of the government for effecting a balance between the supply and demand of steel, copper and aluminum in the forms and shapes indicated in the CMP Materials List (pages 13, 19, 20). Because these metals form the keystone of the entire war production structure of the country, their efficient use will go far in determining the ultimate use of the bulk of other critical materials.

All other orders and regulations issued by WPB, including "E", "L", "M", "P" and "U" orders, remain in effect until amended or revoked. Nothing in any CMP regulation shall be construed to relieve any person from complying with any applicable priorities regulation except as expressly provided; or except where such compliance would require violation of a provision of a CMP regulation. Pending clarification by WPB in each case of conflict, the CMP Regulation must prevail.

After July 1, however, no controlled material shall be shipped or received except in accordance with the Plan, and with respect to controlled materials, no preference ratings, individual allocations under "M" orders or similar procedures or authorizations under the Production Requirements Plan shall be valid.

PRODUCTION SCHEDULING

Special directives have been issued, establishing the following rules for determining production schedules:

Steel Mills

Orders for steel placed prior to March 22 and promised by mills as of March 22 for shipment during the second quarter, were frozen until April 15, 1943. Any order not validated as of that date may be replaced by any new order that has been validated. Preference rated orders validated between March 22 and April 15 take the date of original placement of the order. Orders or validation of orders received after April 15 may be displaced by authorized controlled material orders.

Copper Wire Mills

Authorized controlled material orders for copper wire mill products calling for May and June deliveries must be accepted and scheduled in accordance with the provisions of CMP Regulation No. 1 ahead of orders bearing preference ratings only.

Brass Mills

In the case of brass mills, authorized controlled materials orders for May and June deliveries (for other than Navy and Army ordnance programs designated N-1, O-1, and O-4) must be accepted up to 100 per cent of production directives issued with respect to such programs. If no special production directives have been issued, brass mills are required to accept such orders up to 100 per cent of capacity.

Where an order for either copper wire mill or brass mill products previously placed is converted into an authorized controlled material order, the effective date of the conversion is the date on which the allotment number is received by the producer. Delivery of such orders may be refused if the allotment number is not received in accordance with time limits for placement of controlled materials orders as established in Schedule III (see page 17) of CMP Regulation No. 1.

Aluminum Rod and Bar Mills

If the user of aluminum rod or bar failed to assign May or June CMP allotment numbers with proper certification to its orders before May 1, mills have been directed to remove these orders from their production schedules. No consumer may receive an amount of these products during the second quarter in excess of amounts which have been authorized under CMP for May and June delivery plus amounts authorized for April delivery. Preference is now given to all CMP authorized controlled material orders in securing aluminum rod and bar supplies.

CO-ORDINATION OF ACTIVITIES

Control over the entire Plan is centralized in the WPB Requirements Committee, consisting of the following: a representative of the State Department and a representative of each of the Claimant Agencies. Supply and demand are reconciled and balanced and the Requirements committee awards allotments to the Claimants. The CMP Divisions supervise the supply but the Claimant Agencies determine what they will buy.

Claimant Agencies and Industry Divisions then allot the tonnages they receive to prime consumers who use these allotments to obtain controlled materials used in the production of finished products or allot them to their suppliers, called secondary consumers.

Under operation of CMP, all products are divided into two classes: Class B products are specified by name in the official Class "B" Product List (see pages 14 and 15); Class A products are all other products containing controlled materials.

The maker of a Class A product receives his allotment of controlled materials from the appropriate Claimant Agency, if he is a prime consumer. He receives his allotment from his customer, if his product is a Class A part or sub-assembly.

The maker of a Class B product generally obtains his allotment directly

from the appropriate WPB Industry Division, regardless of whether his product is a finished product or a part or sub-assembly.

A Bill of Materials or other equivalent information is required as a basis for estimating requirements. Such information, however, is prepared by the manufacturer only upon receipt of a request from his customer or a Claimant Agency or Industry Division. The mechanics of this operation have been explained fully in the preceding edition of this GUIDE. While still important, details of the Bill of Materials are overshadowed now by the mechanics of distribution.

Before making allotments to prime consumers, Claimant Agencies readjust their schedules to fit their allotments. Claimant Agencies and Industry Divisions then advise their prime consumers of their allotments and authorized production schedules.

APPLICATION FOR MATERIALS

Applications for controlled materials for any purpose are made on the "application form" to the appropriate Claimant Agency or Industry Division or to consumers. In the case of construction and facilities, these applications are made to the Agency, if the project is for the Agency's sole benefit; otherwise to the appropriate Industry Division.

Applications are made as follows:

By manufacturers of Class A products on form CMP-4A as issued by the appropriate Claimant Agency, except in the case of MRO and when physical delivery is made to a distributor;

By manufacturers of Class B products on form CMP-4B as issued by WPB.

Although allotments are made by quarters, applications must show monthly requirements where required by the application forms, so that information as to overall requirements may be compiled on a monthly basis by the Claimant Agencies and the Controlled Materials Divisions.

Requirements for maintenance, repair or operating supplies (MRO) are not included in either Bills of Materials or applications for allotment. Requirements for such purposes are obtained separately as provided in CMP Regulation 5 and 5A. Such industries as mining and railroads have special arrangements for obtaining MRO. Lend-Lease and the Bureau of Economic Warfare make special applications. Applications for operating supplies should be made to the Agency in the case of plants wholly-owned and operated by the agency.

OPERATING PROCEDURE

The prime consumer is responsible for the accuracy of the Summarized Bills of Materials and Applications which he submits to the Agency or Industry Division, including those submitted to him by secondary consumers. The secondary consumer is responsible in turn for the accuracy of the Bills of Materials and applications he submits to the prime consumer, including those submitted to him by his secondary consumers.

A manufacturer gets his non-controlled materials by means of a preference rating issued to meet the authorized production schedule. He is only allowed to buy these materials in quantities and at the rate required by the schedule. Certain non-controlled materials are allocated at present under "M" orders. The "M" orders will continue in effect, but will be administered with the authorized schedules in mind.

"B" product applications, allotments and authorizations are always handled by the Industry Divisions with the following exception: In certain cases where the "B" product allotments can be handled more suitably by an Agency, the consumers deal with such agency but only upon specific instructions to the consumer.

CONTROLLED MATERIALS PRODUCERS

Controlled materials producers obtain materials required for incorporation in their products by procedures established by CMP Regulation No. 8. This regulation provides a preference rating of AA-1 and an allotment symbol, X-1, which may be applied to purchase orders for other than controlled materials by those controlled materials producers who apply for and receive specific authorization to operate under the regulation's terms. Non-integrated producers also obtain their controlled materials for conversion by allocation under Regulation No. 1.

Applications for controlled materials or Class A products to be physically incorporated by a producer in a controlled material item are made on form CMP-4B, addressed to the Controlled Materials Division which supervises the producer's operations. Under this procedure, a copper wire mill, for instance, requiring steel for the manufacture of steel-armored copper cable should direct its applications for the steel to the Copper Division.

In the case of aluminum, however, required for deoxidizing and alloying purposes, thermit reaction, chemical uses and wire for armoring cable, controlled materials producers use form CMP-13 in making applications for allotments. These applications on CMP-13 should be directed in all cases to the Aluminum Division.

Allocations of controlled materials for further conversion are made to producers in the same manner as allotments for the manufacture of Class A and Class B products.

An exception is made to this procedure when the controlled material required is made of the same basic metal as that produced by the applicant. In such cases, requirements are filled only by directives issued according to the terms of CMP Regulation No. 1. Since there is also an exception to this, the regulation is being revised.

CMP Regulation No. 8 also provides that no consumer of controlled materials is to include in any Bill of Materials or applications for allotment requirements for controlled materials needed for the manufacture of the controlled material to be included in his product. Using the example mentioned earlier, a consumer requiring steel-armored copper cable must not include in his bill of materials or application the steel which will be needed by the copper wire mill to turn out the cable as the mill itself will obtain all of its requirements in the manner provided by the regulation. He will include, however, the copper in his bill of materials.

In cases where a consumer already has received an allotment of controlled materials for the production of any controlled material, or of a Class A product to be incorporated in it, he makes an allotment to the controlled materials producer, and the latter is then to cancel the allotment and report this cancellation to the appropriate Controlled Materials Division within 15 days.

The regulation also specifies in detail the manner in which the preference rating of AA-1 and allotment symbol X-1, which it assigns to approved controlled materials producers, may be used.

ALLOTMENT NUMBERS

Each allotment of controlled material to a prime consumer by a claimant agency will be assigned full allotment number. For example: W 1234-567-16. The first letter represents the Claimant Agency (War Department); next four digits, the authorized schedule (assigned by the Claimant Agency or Industry Division); the next three digits, the authorized production schedule of the prime consumer; the last two digits, the

quarter in which delivery is required. Orders placed by consumers with controlled materials producers are identified by each month instead of quarterly number. A revision of "quarter" numbers is under consideration.

The accompanying table will serve as a ready check of the numerical identification of months and quarters as they stand at this writing.

The allotment number must be noted on all authorized purchase orders or releases against purchase orders placed. The complete allotment number goes only to prime consumers.

If the order is placed with other than a controlled materials producer in connection with an allotment of controlled materials by the purchaser to his customer, the two digits denoting the quarter for which the allotment is valid must be added. If the seller is a producer, the "month" number applies.

Claimant agencies and industry divisions may allot controlled materials for the third and fourth quarter of 1943 and the first quarter of 1944.

Any prime consumer using controlled materials in the production of Class A products will obtain allotments of controlled material for such products from his claimant agency, except MRO and "A" products handled through distributors.

Any consumer, using controlled materials in the production of Class "A" products supplied as component parts or sub-assemblies to any other consumer making class "A" or Class "B" products, will obtain his allotments from such other consumer.

Prime consumers immediately upon receipt of "Allotment" divide these allotments among their secondary consumers (keeping whatever portion they need for themselves) and issue authorizations to them. This is an important step in the smooth operation of CMP. WPB has warned that the flow of materials into war production is impeded seriously whenever a manufacturer who has received allotments fails to pass on the authorizations in proper form to their suppliers. Manufacturers operating under CMP, whose suppliers receive allotments through them must do two things immediately to make sure that they will receive parts and materials when needed:

(1)—Authorize production schedules for their suppliers and

(2)—Make allotments of the necessary controlled materials to the suppliers.

A manufacturer cannot make an allotment without authorizing a production schedule, and an authorized production schedule without an allotment cannot be carried out.

A consumer may make an allotment to his secondary consumer by either:

1—Executing and returning one of the copies of the application (CMP-4A) furnished to the consumer by his secondary consumer or, in the event an application has been waived, by indicating on the prescribed application form the controlled materials allotted and executing and delivering such form to the secondary consumer;

2—Placing on his delivery order for one or more Class A products the short form of allotments (CMP-5, see page 16) subject to specific instructions.

A production schedule may be authorized on forms available in War Production field offices. An alternative procedure is provided in paragraph (n) (2) of CMP Regulation No. 1, under which the delivery date specified on an order constitutes an authorization of the minimum production schedule necessary to make delivery on time.

Allotments of controlled materials may be made to a supplier on form CMP-5 as provided in Schedule II (see page 16), of CMP Reg. No. 1, or on form CMP-4A, at the time a production schedule is authorized. The allotment must specify the amount of controlled material allotted and must bear the abbreviated allotment number.

The abbreviated allotment number consists of a Claimant Agency symbol, the first digit of the Major Program Number, and the two digits indicating the quarter for which the allotment is valid. For example, in the case of an allotment to a prime consumer designated **W-1234-567-16**, the abbreviated allotment number would be **W-1-16**. A person receiving such an allotment in this manner must indicate on his order for controlled materials the month in which delivery is required.

At the time of making allotments, the preference rating assigned to the authorized production schedule must be passed on to the supplier so that he may be in a position to obtain products and materials, other than controlled materials, required to fulfill the schedule.

In those cases where orders for Class A products were placed before the purchaser was in a position to make allotments, the necessary allotments may be made by filing duplicate copies of the purchase orders, following the procedure outlined above, or the purchaser may furnish a supplier with a list of orders for which he is making allotments, so long as each allotment is indicated with the order for which it is made. As a matter of convenience, the order identification may be included in a separate column on form CMP-5.

DATING PROCEDURE

Month	Numeral Assigned 1942	1943	1944
Jan.	1	13	25
Feb.	2	14	26
March	3	15	27
April	4	16	28
May	5	17	29
June	6	18	30
July	7	19	31
Aug.	8	20	32
Sept.	9	21	33
Oct.	10	22	34
Nov.	11	23	35
Dec.	12	24	36

Each quarter is identified by the numeral for the first month in the quarter.

AUTHORIZATION OF PRODUCTION SCHEDULE

The delivery date specified on orders already placed constitutes authorization of a production schedule.

The following sample purchase order illustrates a proper method of making an allotment and authorizing a production schedule:

"Deliver 10,000 *Type X Supporting Arms July* 15, 1943. *Allotment No. W-1-16-* 50 *Tons Carbon Steel. The above allotment is made for use in filling this delivery order in compliance with CMP Regulation No.* 1.

X Y Z Company
By: John Doe, Purchasing Agent
Dated: April 10, 1943"

The manufacturer receiving such an allotment will be in a position to place an authorized controlled material order with a steel producer for delivery in the second quarter.

Authorized controlled material orders placed with a mill must be endorsed with the abbreviated allotment number, **with the last two digits indicating the month** in which delivery is requested. In addition, these orders must bear the following certification prescribed in paragraph (s) (3) of CMP Regulation No. 1 or the alternate optional single standard form (see page 6) made available by CMP Regulation No. 7.

The undersigned certifies, subject to the criminal penalties of Section 35 (A) of the U. S. Criminal Code, that he has received an allotment or allotments of controlled materials (or delivery orders not requiring allotments) authorizing him, pursuant to CMP Regulation No. 1, *to place an authorized controlled material order in the amount herein indicated for delivery in the month specified, and that he is authorized to use the allotment number.*

Such orders must be in sufficient detail to permit entry on mill schedules and must be placed by the times specified in Schedule III (see page 17) of CMP

Regulation No. 1, depending on the type of controlled material ordered.

General Restriction

The general restriction on "Placement of Authorized Controlled Material Orders" is: No consumer shall place (unless previously authorized in writing by the appropriate Division) authorized controlled material orders requesting delivery of the same controlled material either:

1—In the first month of any quarter in an amount exceeding one-third of the aggregate amount of such controlled material for which he has received allotment for the quarter as of the time of placing his order, or

2—In the first two months of any quarter in an amount exceeding two-thirds of such aggregate;

Provided, That in the case of aluminum, during the second quarter of 1943, the limitations shall be 30 per cent for the first month and 63 per cent for the first two months.

No consumer is required by this restriction to reduce a delivery order below the minimum mill quantity specified in Schedule IV of Regulation No. 1 (see page 17). In no event shall a consumer request delivery in a greater amount or an earlier date than required to fill his authorized production schedule, or in an amount so large or on a date so early that receipt of such amount on the requested date would result in his having an inventory of controlled materials in excess of the limitations prescribed by CMP Regulation No. 2 or by any other applicable regulation or order of the War Production Board.

CMP has been placed in full operation with respect to aluminum rod and bar production. Mills were directed to consider orders covered by authorizations made in March or earlier as if they actually were CMP authorized controlled materials orders in determining the amount of other orders they could accept within the limits of a production directive. If the provisions of the direction unfavorably affected any critical requirements of any consumer because his CMP allotments had been used up for the second quarter, he was instructed to submit a CMP-4A form to his Claimant Agency for supplemental allotment.

Producers of controlled materials are prohibited from discriminating between customers in rejecting or accepting orders which are filed later than the prescribed time or which call for deliveries of less than the minimum mill quantities (see page 17). The provisions of Regulation No. 1 mean that, in similar situations, different customers must receive similar treatment. A controlled materials producer who has rejected a late order or small order from one customer is not prohibited from accepting such an order from another customer, if the difference in treatment of the two orders is based in good faith on differences in the practicability of filling the orders in view of the nature of the material ordered, the condition of the production schedule at the time the orders are received, or similar factors.

CERTIFICATION OF ORDERS

The single standard form of certification may be placed on any delivery order, in lieu of any other certification required by any CMP regulation. CMP Regulation No. 7 provides that any delivery order under CMP may be validated by endorsing it or accompanying the order with the following certificate;

"The undersigned purchaser certifies, subject to the penalties of Section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production regulations or orders to place this delivery order, to receive the item (s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order."

If an applicable CMP regulation requires an allotment number or symbol, preference rating or other identification be included in a certification, it must be placed on the delivery order if the form above is used.

SECONDARY CONSUMERS

As soon as secondary consumers receive their allotments and authorizations, they must divide their allotments among their secondary consumers and themselves. No allotments are issued to "B" Product consumers by other consumers at any level.

Under an alternate procedure for the distribution of controlled materials, the prime consumer accumulates an accurate list of all Class "A" secondaries who will eventually obtain allotments from his initial allotment. This list should not include any "B" product consumers or any "A" product consumers operating under "B" product consumers. Upon receipt of allotment, the prime consumer advises all direct secondaries (and the direct secondaries advise their secondaries, etc.) of their schedules.

If all secondaries subsequently report how much controlled materials is needed to produce the schedule, and if the total material needed by all (and by the prime consumer) does not exceed the allotments, the prime consumer immediately issues allotment numbers directly to each secondary consumer on the list.

A preference rating is assigned with each allotment number. The preference rating does not affect deliveries of controlled materials or programmed products, except in cases of manufacturing conflict between programs. It should be noted that the preference rating extends no authority for the delivery of controlled materials from the supplier. This authority is vested in the allotment number. If a conflict does arise between programs, it will be resolved by application to the proper agency or industry division. In the case of controlled materials, only the applicable Division can instruct a producer.

STATUS OF PREFERENCE RATINGS

The place of preference ratings under CMP is defined in Regulation No. 3. Preference ratings are assigned to deliveries of all materials necessary to complete an authorized production schedule for which allotments of any of the controlled materials are made to a prime contractor manufacturing Class A or B products.

When an allotment is passed on to a secondary consumer manufacturing Class A products, the prime consumer making the allotment applies to the secondary's authorized production schedule the same rating he has received for his own related schedule, for use with the appropriate allotment or symbol.

An order bearing a preference rating and an allotment number or symbol out-ranks an order bearing the same rating but no allotment identification. It is not, however, superior to another order bearing a higher rating. Authorized controlled material orders requiring May and June deliveries must be accepted and scheduled for delivery, except as otherwise expressly author-

RANKING OF ORDERS

*	With Allotment Number or symbol	Without Allotment Number or symbol
1	AA-1	
2		AA-1
3	AA-2X	
4		AA-2X
5	AA-3	
6		AA-3
7	AA-4	
8		AA-4
9	AA-5	
10		AA-5

*AAA takes precedence over all others and is only customer's rating that can be extended (but not to replenish inventory) by Class B producer.

ized by WPB, in accordance with the provisions of CMP Regulation No. 1 ahead of approved orders bearing preference ratings only.

Any authorized controlled material order rated AAA, placed with a warehouse or another party who is not a controlled material producer, takes precedence over all other orders.

However, authorized controlled material orders placed with a producer of controlled materials must be accepted and filled as provided in CMP Regulation No. 1 without regard to ratings and in preference to all other orders. To the extent that producers are able to fill other orders, prior to July, 1943, they must do so in accordance with the preference ratings assigned or extended. After July 1, 1943, no controlled materials may be delivered except on orders bearing an alloment number or symbol such as MRO, SO, WH, PI, FC, etc.

A prime consumer who manufactures Class B products and has received an authorized schedule, accompanied by a preference rating to be used with his allotment number, may not extend any other rating received from a customer, except an emergency rating of AAA. This rating may be extended in such cases only to obtain production material required to fill the order to which it is applicable and not for the purpose of replenishing inventory.

The following form of certification, or the standard form authorized by Regulation No. 7, (see page 6) must be filed by a prime or secondary consumer when placing an allotment number or symbol on a rated delivery order:

"Preference rating . . . Allotment number or symbol . . . The undersigned certifies, subject to criminal penalties for misrepresentation contained in section 35 (A) of the United States Criminal Code, that he is authorized under CMP Regulation No. 3 to apply or extend the above preference rating and allotment number or symbol to the delivery of the items covered by the attached delivery order."

A prime or secondary consumer who receives a preference rating for an authorized production schedule may use the rating with the appropriate allotment number or symbol only to obtain production materials in the minimum practicable amounts required to complete the schedule, or to replace production materials in his inventory. Production material includes items purchased by a manufacturer for resale to round out his line, if these items do not amount to more than 10 per cent of his total sales.

Regulation No. 3 permits a manufacturer who has received a rating with an authorized production schedule to apply to deliveries to be made to him during the second quarter of this year any rating previously received including his PRP rating which he is authorized to use despite the provisions of Priorities Regulation No. 12 regarding the compulsory extension of downward re-ratings. In authorizing production schedules for secondary consumers of controlled materials to whom he has already extended a rating previously received by him, such a manufacturer may extend the appropriate allotment number for use with the earlier rating.

Materials "other than controlled materials" are authorized by preference ratings only (except that "M" orders will continue in force and operation for specific materials other than controlled materials until amended or revoked.)

The authorized product schedules govern the quantity of "other" materials which may be purchased and the rate at which they may be purchased.

The prime consumer may not procure "other" materials in greater quantities or at a more rapid rate than required by his product schedule as authorized by an agency or industry division.

The secondary consumer may not procure "other" materials in greater quantities or at a more rapid rate than required by his schedule for parts or sub-assemblies as authorized by his prime consumer or another secondary consumer.

DISTRIBUTORS' ORDERS

Dealers, distributors and jobbers who are permitted to extend priorities ratings under the terms of CMP Regulation No. 3, have been granted assistance until June 30 on orders which have already been placed, to prevent discrimination against their rated orders to which allotment numbers have not been applied.

Orders without allotment numbers or symbols, placed by dealers, distributors, or jobbers prior to April 7, 1943, calling for delivery not later than June 30, must be deemed of equal rating to orders bearing the same grade of rating with allotment numbers or symbols.

Companies which supply distributors, jobbers, and dealers will have to take this factor into account in adjusting production and delivery schedules of items ordered for delivery prior to the beginning of third quarter operations under CMP.

Housing Projects

Under CMP the National Housing Agency, as claimant for the war housing program, assigns preference ratings and allots controlled materials in connection with the processing of applications for privately-financed housing construction. Consumers must file a PD-105, the application form used for residential construction, and a PD-105A form, which contains a materials list. Consumers are then granted a P-55-b form, which authorizes the beginning of construction provided that only those materials are used which have been approved on the materials list (PD-105A). To obtain materials, consumers must submit to the National Housing Agency form CMP-H-1 requesting allotments and preference ratings.

For privately-financed housing projects, the CMP-H-1 form is filed with the same field office of the Federal Housing Administration with which the original application (PD-105) was filed.

The CMP-H-1 form is a request to the NHA for an allotment of controlled materials in accordance with the approved quantities as shown in the summary of the materials list (PD-105A). The form also is used for allotments, and, on the basis of the consumer's request, the NHA may allot materials and assign preference ratings under a program determination by WPB which involves the assignment of AA-3 ratings.

One significant specification in the procedure is that which limits the period of time during which the P-55-b is operative. This authority to begin construction is operative only for a specified time, and, if no request for allotment of controlled materials or assignment of preference ratings is made on CMP-H-1 within this period, the authorization is withdrawn. The specified period of time varies according to the type of construction being undertaken.

ORDERING AND DELIVERY OF MATERIALS

Upon the receipt of allotment the consumer places orders for controlled materials with suppliers. These controlled materials are to be delivered as authorized. For the convenience of the consumer's purchasing procedure, "purchase orders" governing controlled materials and "other" for a long term contract may be placed.

No part of a "purchase order" can be deemed an "authorized order" until the applicable allotment number for that part of the order has been released, specifying deliveries consistent with allotment schedule and covered by allotment number.

No authorized order can be placed (or "release" issued) to specify delivery for "other" materials at a more rapid rate than that required by an authorized allotment schedule covered by an allotment number.

COMBINING ORDERS

A consumer of controlled materials who receives numerous purchase orders

bearing allotment numbers authorizing the purchase of small quantities of controlled materials may combine such small allotments into one purchase order from the material supplier (subject to regulations detailed in CMP).

A controlled material supplier, receiving an authorized order or release (bearing an allotment number) may ship such order under restricted conditions any time from the 15th of the month preceding the month specified to the last day of the month succeeding the month specified.

TRANSITION PERIOD

Some consumers of controlled materials cannot obtain allotments of controlled materials in time for operations during the present quarter. For these cases the PD-25A authorization for the first quarter of 1943 has been extended for the same quantities of materials or adjusted by PD-25F.

If a PRP unit receives allotments under CMP after having received authorization on PD-25A for the second quarter, or vice versa, the authorizations on PD-25A must be reduced by the amount of allotments made under CMP.

Orders bearing CMP allotment numbers for controlled materials or for products containing controlled materials will be given preference over orders under the PRP.

SALES BY WAREHOUSES

Warehouses handling controlled materials are considered a part of supply and distribution of their products is governed by provisions of CMP Regulation No. 4.

Steel

Deliveries of steel from stock by distributors are prohibited except to fill authorized controlled material orders and other orders as specified below. Each distributor must fill all authorized controlled material orders to the extent of his available stocks, subject to the following:

(1) A distributor must reject any authorized controlled material order calling for delivery at any one time, to any one person, at any one destination of 40,000 pounds or more of steel unless such order includes 10 or more individual items; or unless all items covered by the order consist of oil country tubing, casing, or drill pipe. Each item in this provision is designated as being of a different specified quantity, length or cross-section, and no item weighing more than 8000 pounds.

(2) A distributor may apply to WPB for authority to reject an authorized order (and may delay filling the order until the application is acted upon) if filling of the order calling for delivery of steel would deplete his stocks to a point where his function in the distribution of materials would be seriously impaired.

In addition a distributor is permitted to fill delivery orders for steel other than authorized controlled material orders as follows:

(1) Orders in amounts of $10 or less;

(2) Orders bearing preference ratings of AA-5 or higher on which delivery is made prior to July 1, 1943, subject to the same quantity restrictions which apply, as stated above, to deliveries on authorized controlled material orders.

(3) Orders calling for delivery of carbon steel which are authorized under Food Production Order No. 3, issued by the Secretary of Agriculture;

(4) Orders calling for delivery of not more than the following amounts in pounds of each product classification and type indicated below, to the same customer, at the same destination, during any calendar quarter:

	Carbon†	Alloy‡	Stainless
Structural shapes and piling	8000		...
Plates	8000	2000	300
Hot rolled bars, including concrete reinforcing bars	6000	2000	300
Cold finish bars	4000	2000	300
Tool steel, including drill rod	300	300	...
High carbon spring steel	300	....	...
Tool steel bits	5	....	...
Mechanical tubing	*1000	....	300
Pressure tubing	*2000	....	...
Sheets and strip, hot rolled	6000	....	...
Sheets and strip, cold reduced	6000	....	300
Sheets and strip, galvanized	6000	....	...
Sheets and strip, all other, including black plate	6000	....	...
Pipe	4000	....	...
Wire, wire products	4000	....	100
Tin and terneplate	2000	....	...

*Feet. †Including wrought iron. ‡Other than stainless.

Provided, however, That each order placed under this subparagraph (4) shall be accompanied by or endorsed with the following certificate:

The undersigned hereby certifies to the distributor with whom this order is placed and to the War Production Board, subject to the criminal penalties provided in section 35 (A) of the United States Criminal Code, that receipt of the steel covered by this order, together with all other steel received by, or on order for delivery to, the undersigned, from all sources, during the same quarter, will not exceed the limits specified in paragraph (d) (4) of CMP Regulation No. 4.

The regulation specifically prohibits any person who obtains steel pursuant to the above quantity provisions from obtaining steel from any sources in the same calendar quarter in amounts aggregating more than the amounts shown in the above table.

Copper

A warehouse may fill an authorized controlled material order, or an order bearing a preference rating of AA-5 or higher for brass mill or wire mill products, from his stocks, provided that,

(1) Such order does not require delivery of more than 500 pounds (copper or alloy weight) of any item to any one destination, at any one time; and

(2) Such order is accompanied by or endorsed with the following certificate:

The undersigned hereby certifies to the warehouse with whom this order is placed and to the War Production Board, subject to the criminal penalties provided in section 35 (A) of the United States Criminal Code, that the amount of each item of brass mill or wire mill products covered by this order, together with all other amounts of such item received by, or on order for delivery to the undersigned, at any one destination from warehouse stock, during the same month, does not exceed 2000 pounds, and that such items will not be used by the undersigned for any purpose in violation of any order of the War Production Board.

No person who obtains any item pursuant to the above provisions can accept deliveries of the same item at any one destination aggregating more than 2000 pounds, during any one calendar month, from warehouse stocks.

Aluminum

Each distributor must, to the extent of his available stocks, fill authorized controlled material orders, except that he must reject any authorized order calling for delivery at any one time, to any one person, at any one destination, of more than 500 pounds of any gage, alloy and size of aluminum sheet, or more than 300 pounds of any alloy, shape and size of aluminum wire, rod or bar, or more than 200 pounds of any alloy, size and shape of aluminum tubing, extrusions, or structural shapes:

Provided, however, that any distributor may fill an authorized controlled material order calling for delivery of 2000 pounds or less of aluminum sheet, 1000 pounds or less of aluminum wire, rod or bar, or 500 pounds or less of aluminum tubing, extrusions or structural shapes (under the same conditions as stated above) if such distributor shall first have requested the mill supplying him to fill such order and such mill shall have advised him to fill the order from his stock. This request and advice may be made verbally but must be confirmed in writing.

A distributor may fill orders other than authorized controlled material orders, calling for delivery of aluminum required for essential maintenance, re-

pair and operating supplies, in the amount and subject to limitations provided in CMP Regulation No. 5.

General Provisiions

Warehouses also carry "earmarked" stocks for claimant agencies to the amount agreed upon between the claimant agencies. Warehouses also fill small orders up to the amount specified by controlled material divisions without allotment number for this type of order.

A delivery order for steel, brass mill products, wire mill products or aluminum are deemed an authorized controlled material order only if it is specifically designated as such by any regulation of WPB; or if it is endorsed with the appropriate allotment number as required by CMP Regulation No. 1.

Any delivery order requiring shipment within seven days may be placed verbally but written confirmation of the order must be furnished within that period complying with the requirements of Regulation No. 4. In case of failure to receive written confirmation within seven days, the distributor or warehouse is prohibited from accepting any other order from or deliver any additional material to the purchaser until such confirmation is furnished.

Every distributor or warehouse who has received in the prior month a delivery order by telephone must notify the WPB Compliance Division of any case in which a purchaser has failed to furnish to him the written confirmation when due.

An authorized controlled material order, placed with a distributor or warehouse bearing a rating of AAA must be filled in preference to any other order, regardless of time of receipt.

Resellers of controlled materials who ship them to foreign countries (other than Canada) are permitted to accept allotments from their foreign customers and pass them along to producers of steel, copper, and aluminum in this country in placing orders for these items.

Schedule "A" of Regulation 2

If a user of controlled materials would be authorized under paragraph (b) to accept delivery of a quantity of an item of controlled material less than the minimum shown opposite the appropriate class of controlled material on the following schedule, he may accept delivery of the full minimum shown on the schedule.

CMP material code No.	Class of controlled material	Minimum quantities
	ALUMINUM	Pound
	Bar and rod (excluding requirements for stock for wire, forgings, rolled structural shapes, and electrical cable)	300
4021	⅜"—¾" incl. (Maximum diameter (for rounds and ovals). Maximum distance between parallel faces (for squares, hexagonals, octagonals & rectangles.)	
4031	Over ¾"—1⅛" incl.	
4041	Over 1⅛"—3" incl.	
4051	Over 3"	
4121	Wire, excluding rivet wire. (Wire covers maximum diameters under ⅜" in rounds, ovals, squares, hexes, octagonals, and rectangles)	100
4122	Rivets	25
4131	Cable (electrical transmission only)	2,000
4171	Forgings and pressings (before machining)	300
	Castings made from high-grade ingot (before machining)	500
4202	Cylinder heads for air-cooled radial engines.	
4203	Other heat treated sand castings.	
4204	Non-heat treated sand castings.	
4205	Heat treated permanent mold castings.	
4206	Non-heat treated permanent mold castings.	
4207	Cold-chamber die castings.	
4208	Gooseneck die castings.	
	Castings made from low-grade ingot (before machining)	500
4213	Heat treated sand castings.	
4214	Non-heat treated sand castings.	
4215	Heat treated permanent mold castings.	
4216	Non-heat treated permanent mold castings.	
4217	Cold-chamber die castings.	
4218	Gooseneck die castings.	
4251	Rolled structural shapes (angles, channels, zees, tees, etc.)	500
	Extruded shapes	100
4301	2S, 3S, 53S, and 61S alloys.	
4311	All alloys except 2S, 3S, 53S, and 61S.	
	Sheet, strip and plate (excluding stock for foil, impact extrusions, and forgings)	200
4351	2S, and 3S alloys.	
4361	Alloys other than 2S and 3S.	
	Tubing	100
4401	2S and 3S alloys.	
4411	Alloys other than 2S and 3S.	
4501	Powder	15
4601	Foil (0.008" and thinner)	25
4701	Impact extrusions	200
	Ingot (excluding ingot for aluminum castings, sheet, plate, strip, rod, bar, extrusions, and powder)	2,000
4801	High-grade ingot.	
4811	Low-grade ingot.	

CMP material code No.	Class of controlled material	Minimum quantities
	COPPER AND COPPER BASE ALLOYS	Pound
	Brass mill products:	
	(A) Copper base alloys:	
3001	Ammunition cups, discs, and slugs	5,000
3011	Sheet and strip (other than cups and discs)	300
3021	Rods, bars, and wire (incl. extruded shapes, not incl. slugs)	500
3041	Tubing or pipe	500
	(B) Copper:	
3051	Plate, sheets, and strip	500
3061	Rods, and bars, including extruded shapes (not including wire bars and ingot bars)	500
3071	Tube and pipe	500
	Wire mill products:	
	Copper:	
3101	Wire and cable (incl. copper content of insulated wire and cable)	500
	Foundry products:	
	Copper and copper base alloys:	
3201	Castings	500
	STEEL	
	Carbon steel (including wrought iron):	
2001	Bars, cold finished	10,000
2005	Bars, hot rolled	10,000
2011	Ingots, billets, blooms, slabs, tube rounds, skelp and sheet and tin bars	50,000
2016	Pipe	10,000
2021	Plates	10,000
2026	Rails and track accessories	50,000
2031	Sheets and strip	10,000
2036	Steel castings	10,000
2041	Structural shapes and piling	40,000
2046	Tin plate, terne plate and tin mill black plate	10,000
2051	Tubing	10,000
2056	Wheels and axles	40,000
2061	Wire rods, wire and wire products	10,000
	Alloy steel—Including stainless:	
2501	Bars, cold finished	2,000
2505	Bars, hot rolled	2,000
2511	Ingots, billets, blooms, slabs, tube rounds, sheet bar	10,000
2516	Pipe	2,000
2521	Plates	2,000
2531	Sheets and strip	2,000
2536	Steel castings	2,000
2551	Tubing (incl. pipe)	2,000
2556	Wheels and axles	40,000
2561	Wire rods, wire, and wire products	2,000

INVENTORY CONTROL

The cardinal ruling in CMP Regulation No. 2 is that manufacturers and other users of controlled materials must hold their inventories at a practicable minimum working inventory and in any event at a maximum of 60 days' forward requirements.

Inventory limitations are on the basis of "item of controlled material" which is defined as "any item in any class of controlled material listed in Schedule A which is different from all other items in that class by reason of one or more of its specifications, such as length, width, thickness, temper, alloy, finish, method of manufacture, etc."

Inventories of all other items remain subject to Priorities Regulation No. 1.

Users of controlled materials, including government-operated consuming establishments, must file reports on form CMP-7 if requested by WPB. If the answer to item 1 and item 2 on this form is "no," it is necessary to fill in the heading of the form only, sign the certification at the bottom of the page and return it to WPB.

A form which combines the Plant Report of Operations (WPB-732) with the quarterly Report on Shipments of Products and Inventories of Critical Materials (CMP-7) is used by some 15,000 manufacturers working on the principal war contracts. Use of this form eliminates the necessity of an additional questionnaire on the consumption of power.

General Exceptions

Delivery of items of controlled materials in excess of the above prescribed limitations may be accepted under the following circumstances:

1—If any producer of controlled material exercises his privilege under CMP Regulation No. 1 of making delivery prior to the delivery date specified by the user;

2—If a user has promptly instructed a supplier to reduce, postpone, or cancel a delivery, and the material has been shipped or loaded for shipment before receipt of such instruction, delivery of the material may be accepted, provided the supplier promptly advises the user why the delivery has been made despite the instructions.

3—If a user would be authorized un-

der the general restrictions to accept delivery of a quantity of any item less than the minimum shown on Schedule A, he may accept delivery of the full minimum shown on the Schedule.

4—If a user has promptly instructed a producer to reduce or postpone a delivery of a special item which cannot be readily disposed of in the course of the producer's business, and if production of the item has already been started, delivery may be accepted of the minimum quantity which the producer will have to complete in the light of the production he has started. This exception applies only to the acceptance of delivery of such special items before they are needed and not to acceptance of items which will not be needed at all.

The regulation also provides that excess inventories of controlled materials, including inventories of materials which are not in such form as to be usable by the holder are subject to redistribution to other persons by voluntary action, pursuant to Priorities Regulation No. 13, or if necessary, through requisitioning by WPB.

Specific Exceptions

Regulation No. 2 provides that WPB may fix by specific direction longer or shorter periods or otherwise vary the inventory limits for any person or class of persons. The following modifications have been issued:

Communications

Telephone companies have been exempted from the 60-day inventory restrictions and are now subject to restrictions imposed on inventories in Utilities Order U-3. The exemption applies to "operators" in the communications field to the extent that they are engaged in rendering telephone communication service (and such telegraph and teletype service as may also be conducted by them) within, to, or from the United States, its territories, or possessions.

Petroleum, Mining, Utilities

Petroleum operators, mining producers, utilities and certain can manufacturers also have been exempted from the inventory provisions of Regulation No. 2.

P-98-c, relating to production, transportation, refining and marketing of petroleum, will continue to govern their operations. In the case of mining producers, provisions of P-56, as amended March 17, limit delivery of material which would increase a producer's inventory to an amount no greater than the minimum necessary to sustain his current level of operations.

Electric power, natural and manufactured gas, water, and central steam heat suppliers will continue to be governed by the inventory provisions of Utilities Order U-1. In the case of electric power producers it provides in part that not more than 50 per cent of permitted deliveries of wire, cable, and bus bar may be scheduled for delivery from a supplier other than another producer of electric power. In the case of producers of gas, water, central steam heat and public sanitation, it provides in part that not more than 75 per cent of permitted scheduled deliveries of iron and steel pipe may be scheduled for delivery other than to another producer.

Can manufacturers in Washington, Oregon, and Utah are permitted to carry a 90-day inventory of tinplate for the making of cans during the canning season, or until Sept. 30, 1943. After that date, the normal limitation to a 60-day supply will apply again to stocks of tinplate for the manufacture of cans in the areas affected.

MRO SUPPLIES

Regulation No. 5, controlling purchases of maintenance, repair and operating supplies, establishes required procedures for obtaining both controlled and non-controlled materials.

Persons engaged in the manufacture of products or in the business activities listed in Schedules I and II (see page 18) of the regulation are permitted to obtain necessary controlled materials, other than aluminum, for MRO by use of the following certification:

"CMP allotment symbol MRO—(P order No. . . .)—The undersigned certifies, subject to the criminal penalties for misrepresentation contained in section 35 (A) of the United States Criminal Code, that the controlled materials covered by this order are required for essential maintenance, repair or operating supplies, to be used for a purpose listed in Schedule I or Schedule II of CMP Regulation No. 5 and that delivery thereof will not result in a violation of the quantity restrictions contained in paragraph (f) of said regulation."

An order bearing this certification is deemed an authorized controlled material order and has the same status as an order bearing an allotment number under all applicable CMP regulations, unless otherwise expressly provided.

Any person listed in these schedules requiring aluminum for essential maintenance, repair and operating supplies, may obtain them in amounts of not to exceed 100 pounds per calendar quarter, provided the order is accompanied by the following certificate:

"The undersigned certifies, subject to the criminal penalties for misrepresentation contained in section 35 (A) of the U. S. Criminal Code, that the materials covered by this order are required for essential maintenance, repair or operating supplies, to be used for a purpose listed in Schedule I or II of CMP Regulation No. 5; that the use of other materials for such purpose is impracticable; and that the amount of aluminum covered by this order, together with all other amounts received by, or on order for delivery to the undersigned, from all sources, for such purposes during the same quarter, will not exceed 100 pounds."

The regulation assigns a preference rating (see page 18) of AA-1, to deliveries of all materials needed for maintenance, repair and operation by persons covered by Schedule I; AA-2X to those covered by Schedule II; and A-10 for MRO supplies needed by all other persons producing any product or conducting any business.

The above preference ratings may be applied only by use of the following certification (in lieu of the endorsement specified in Priorities Regulation No. 3):

"Preference rating . . . (specify rating)—MRO. The undersigned certifies subject to the criminal penalties for misrepresentation contained in section 35 (A) of the United States Criminal Code, that the items covered by this order are required for essential maintenance, repair and operating supplies; that this order is rated and placed in compliance with CMP Regulation No. 5; and that the delivery requested will not result in a violation of the quantity restrictions contained in paragraph (f) of said regulation."

These quantity restrictions (*now being revised*) include the following: Use of the ratings cannot be used to obtain MRO supplies during any quarter exceeding the average 1942 quarterly rate, except that a person engaged in a seasonal business may use the allotment symbol or preference ratings to obtain during any quarter the same amount as purchased in the like quarter of last year.

Effect on "P" Orders

In general, the "P" orders will remain in effect and the provisions contained in them will continue to be operative until changed or revoked. The regulation affects these "P" orders as follows:

(a) When a person using the MRO certification for controlled materials is covered by a P order he must also show the number of such P order;

(b) The restrictions as to the amount of expenditure for maintenance, repair and operating supplies specified in CMP Regulation No. 5 apply in addition to any quantitative restrictions contained in any P order unless the particular P order expressly provides that the restrictions of CMP Regulation No. 5 shall be inapplicable;

(c) The preference ratings assigned by the regulation supersede the preference ratings assigned by all "P" orders for MRO with respect to materials or products to be delivered after March 31, 1943, except as may be otherwise provided by amendments to such orders specifically providing to the contrary;

(d) All other terms, provisions, and restrictions in all P orders covering maintenance, repair and operating sup-

plies, including definitions, requirements for making applications, and filing reports remain in force until modified or revoked;

(e) In addition, each person, who, in accordance with existing priorities procedures not covered by P orders, is required to file applications or reports with respect to his requirements for, or use of, maintenance, repair or operating supplies, or is limited in the amount of such supplies which he is permitted to acquire or use, shall continue to comply with such procedures until they are modified or revoked.

MRO FOR GOVERNMENTAL AND PRIVATE AGENCIES

Necessary procedures for obtaining maintenance, repair and operating supplies by governmental agencies and private institutions, such as schools, churches, hospitals, libraries and welfare establishments, are provided for in CMP Regulation No. 5A. The regulation assigns an allotment symbol, MRO-5A, and preference ratings of AA-1, AA-2X and A-10 for use by the groups it covers (see page 17).

Excepted from the provisions of the regulation are the following services: gas, light, power, water and central heating and communications, which are covered by other orders.

No agency or institution to which a rating for MRO supplies is extended on form PD-408 may use during the quarter for which that rating is assigned any rating provided in Regulation 5A. It may place, however, an authorized controlled material order for the amount of controlled materials rated on its PD-408 in the manner prescribed in the new regulation, if the supplies are needed in connection with any of the activities listed in Schedules I and II.

Minor items of productive capital equipment and minor capital additions or replacements not exceeding 500 (excluding cost of labor) may be included as MRO supplies*. The acquisition and use of materials for construction are subject to the provisions of conservation order L-41. No item specified in List A can be included as MRO supplies, even if it would otherwise come within the foregoing definitions.

CONSTRUCTION AND FACILITIES

The following notice has been issued by WPB regarding the proposed CMP Regulation No. 6—Construction and Facities which is now in draft form:

The issuance of proposed CMP Regulation No. 6 covering procedures for obtaining controlled materials for construction and facilities under the CMP has been postponed (*as of March* 22) pending a revision of processing procedures and standardization of forms.

All current construction jobs authorized in accordance with WPB orders prior to Feb. 17, 1943, have been assigned to individual Claimant Agencies.

Claimant Agencies have contacted jobs under their jurisdiction requesting applications for controlled materials. The following forms are being used: Form CMP-OCE No. 1—War Department; CMP-14, CMP-15 and CMP-4C—Office of Civilian Supply; Forms CMP-16, CMP-17 and CMP-4C—Facilities Bureau; and Form CMP-4C—All other Claimant Agencies.

In the case of construction projects authorized subsequent to Feb. 17, 1943, instructions are issued to the consumers involved indicating the Claimant Agency to which applications for controlled materials are to be directed and the specific application forms to be used. Applications for authorization to construct will, until further notice, be made in accordance with existing procedures.

All of the provisions of CMP Regulation No. 1 are applicable to construction operations with the following exceptions. None of the provisions of such regulation respecting the authorization of or compliance with production schedules applies to construction and the provisions of paragraph (s-1), restricting the placement of authorized controlled material orders to specified quantities, do not apply to construction. Preference ratings assigned to construction projects may be applied or extended only for the purpose of acquiring those items of materials specifically approved in connection with the issuance of the authorization to construct. Numbers identifying allotments for construction may be used along with such preference ratings in the same manner as provided in CMP Regulation No. 3 governing preference ratings assigned to production schedules.

*Expect clarification of this provision at an early date.

INDEX OF CERTIFICATIONS

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CMP Forms

Form No.	Title	When filed	Copies to
CMP-1	Summary bill of materials	.....	Agency or Div.
CMP-2	Detail bill of materials	.....	Agency or Div.
CMP-3	Listing of Class B, Group 1 products and GFE for bill of materials	.....	Agency or Div.
CMP-4A	Application for allotment of controlled materials for Class A products (3rd quarter, 1943)	.....	Consumer or Agency
CMP-4B	Application for allotment of controlled materials for Class B products	4-15-43	WPB
CMP-4C	Application for allotment of controlled materials for construction and facilities (2nd quarter, 1943)	.....	WPB
CMP-7	Quarterly report on shipments of products and inventories of critical materials	2-22-43	WPB
CMP-9	Supplementary application for allotment of aluminum forgings, pressings or impact extrusions (3rd succeeding month)	5th of month	Varies
CMP-11	Steel warehouse purchase (and shipment) authority	on application	Producer
CMP-12	Aluminum products: cumulative report of authorized orders accepted for delivery (preceding week)	Thursday a.m.	Division
CMP-13	Aluminum Metal: application for allotment for alloying, deoxidizing, thermit reaction and chemical uses (succeeding quarter)	25th of 2nd preceding month	Division
CMP-14	Application for allotment of critical materials for construction and facilities	as specified	O.C.S.
CMP-15	Requirements for Class B products for construction and facilities	as requested	O.C.S.
CMP-16	Facilities Bureau: claimant agency requirements for controlled materials for construction and facilities	as requested	O.C.S.
CMP-17	Facilities Bureau: claimant agency requirements for Class B items for construction and facilities	as requested	O.C.S.
CMP-19	Aluminum Castings: Monthly report of operations, inventory, orders (same month)	10th of month	Division
CMP-20	Furniture: additional information required for CMP-4B	upon receipt	Division
CMP-21	Aluminum distributors' weekly report of orders accepted for delivery (preceding week)	Wednesday	Division
CMP-23	Aluminum primary producers' and secondary smelters' monthly report of ingot shipments and unfilled orders	10th of month	Division

Additional copies of this special section on Priorities, Allocations and Prices may be obtained by regular subscribers by addressing STEEL, Readers Service Department, Penton Building, Cleveland, O.

Glossary

Allotment means (i), a determination by the Requirements Committee of the WPB of the amount of controlled materials which a Claimant Agency may receive during a specified period, or (ii) a further determination pursuant thereto by a Claimant Agency, Industry Division, prime consumer or secondary consumer, as to the portion of its allotment of controlled materials which may be received by one of its prime consumers or secondary consumers, as the case may be.

Authorized controlled material order means any delivery order for any controlled material as such (as distinct from a product containing controlled material) which is placed pursuant to an allotment as provided in paragraph(s) of this regulation or which is specifically designated to be such an order by any regulation or order of the WPB.

Authorized production schedule means a production schedule specifically authorized within the limits of an authorized program by a Claimant Agency or by an Industry Division with respect to a prime consumer, or specifically authorized by a prime or secondary consumer with respect to a secondary consumer producing products for it as required to meet an authorized production schedule.

Authorized program means a program specifically authorized by the Requirements Committee or by a Claimant Agency or Industry Division within the limits of its allotment.

Claimant Agency means the following government offices and such others as may be designated from time to time. (Identifying symbols are shown)

A—Department of Agriculture.

C—Aircraft Resources Control Office (agent for Army Air Forces and Bureau of Aeronautics of United States Navy).

E—Board of Economic Warfare.

F—Facilities Bureau of the WPB.

H—National Housing Agency.

L—Office of Lend-Lease Administration.

M—Maritime Commission.

N—Navy Department.

O—Ordnance.

P—Petroleum Administration for War.

R—Office of Rubber Director.

S—Office of Civilian Supply.

T—Office of Defense Transportation.

U—Office of War Utilities Director.

W—War Department (except Ordnance).

The symbol (D) will be used in lieu of Claimant Agency symbols to identify certain programs covering items destined for the Dominion of Canada.

Class A Product means any product containing any controlled material fabricated beyond the forms and shapes specified in the CMP Materials List, except a Class B product.

Class B Product means any product containing any controlled material fabricated beyond the forms and shapes specified in the CMP Materials List, which is contained in the Class B List of the Controlled Materials Plan.

CMP Materials means the materials on the list attached to copies of the plan. The list includes controlled materials and other materials for inclusion in bills of materials and inventory reports.

CMP MATERIALS LIST

(Units: pounds except for wood)

Controlled Materials:

Aluminum, Copper and Copper Base Alloys, Steel.

Other Materials:

*Beryllium; *Cadmium; *Cobalt—other than in steel; Cordage Fibers—Manila, Sisal, Jute, Istle; Magnesium; Mercury; Mica—other than ground mica; Monel—natural; *Nickel—other than in steel; Nylon; Rayon—high tenacity; Rubber—Crude and Buna "S" Liquid Latex, Reclaimed, Synthetic; *Tin—other than on tin plate; *Tungsten—other than in steel; Wood; *Zinc.

Controlled Materials Division means the Division of the WPB which is charged with supervision over the production and distribution of any controlled material. References to decisions or actions of a Controlled Materials Division mean decisions or actions by the Director of the Division.

Delivery order means any purchase order, contract, release or shipping instruction which constitutes a definite and complete instruction from a purchaser to a seller calling for delivery of any material or product. The term does not include any contract, purchase order, or other arrangement which, although specifying the total amount to be delivered, contemplates that further instructions are to be given.

Distributor (with respect to steel) means any person (including a warehouse, jobber, dealer or retailer) who is engaged in business of receiving steel for sale or resale and who does not process the material so sold otherwise than by performing such operations as cutting to length, shearing to size, torch cutting or burning to shape, sorting, and grading, or pipe threading; but a person who, in connection with any sale, forms, bends, punches or performs any fabricating operation designed to prepare steel for final use of assembly shall not be deemed a distributor with respect to such sale.

Distributor (with respect to aluminum) means any person who is specifically authorized by the WPB to engage in the business of receiving aluminum for sale or resale.

Warehouse (with respect to copper) means any industrial supplier, mill supplier, plumbing supply house, or other person engaged in the business of distributing brass mill products or wire mill products to industry or trade otherwise than as a controlled material producer.

Item of Controlled Material means any item in any class of controlled material listed in Schedule A (see page 9) of Regulation No. 2 which is different from all other items in that class by reason of one or more of its specifications, such as length, width, thickness, temper, alloy, finish, method of manufacture, etc.

MRO means maintenance, repair and operations supplies. **Maintenance** means minimum upkeep necessary to continue a facility in sound working condition.

Repair means restoration of a facility to sound working condition when the same has been rendered unsafe or unfit for service by wear and tear, damage, failure of parts or the like: provided, that neither maintenance nor repair shall include the improvement of any plant, facility or equipment, by replacing material which is still usable, with material of a better kind, quality or design. However, MRO may include minor items of productive capital equipment and minor capital additions or replacements not exceeding $500 (excluding cost of labor), subject to approval by WPB.

Operating Supplies means any materials or products which are normally carried by a person as operating supplies according to established accounting practice and are not included in his finished product, except that materials included in such product which are normally chargeable to operating expense may be treated as operating supplies. The term also includes such items as hand tools, customarily purchased by the particular employer for sale to his employes for use only in his business, in those cases where they would constitute operating supplies under established accounting practice if issued to employes without charge. The term does not include any of the items specified in List A (see page 00) of Regulation No. 5.

"PI" is the abbreviation for "Producers Interchange" and must be used as an endorsement on orders for deliveries of steel from one producer to another, when the purchasing producer resells it at the mill price together with steel of his own production. A controlled materials producer may reject such orders, but may not discriminate between customers in rejecting or accepting them.

Production schedule means a plan specifying the total amount of an item or class of items to be produced by an individual consumer in a specified period of time.

Production Material means material or products (including fabricated parts and subassemblies) which will be physically incorporated into his product and includes the portion of such material normally consumed or converted into scrap in the course of processing. It also includes items purchased by a manufacturer for resale to round out his line, if such items do not represent more than 10 per cent of his total sales. It does not include any items purchased by him as manufacturing equipment of for maintenance, repair and operating supplies.

Program means a plan specifying the total amount of an item or class of items to be provided in a specified period of time.

Prime Consumer means any person who receives an allotment of controlled material from a Claimant Agency either directly or through an office of such Agency. Prime consumess whose requirements are handled by the Office of Civilian Supply receive their allotments from WPB Industry Divisions.

Secondary Consumer means any person who receives an allotment of controlled material from a prime consumer or another secondary consumer.

Class "B" Product List

This is the official CMP Class B Product List. WPB has announced that no amendment in this "B" list is contemplated for the third quarter of 1943.

The alphabetical list is for convenient reference and is divided into Class B Group I products and Class B Group II products for guidance in the preparation of bills of materials.

The Class B products described under Group I are to be listed on CMP-3 in the detail shown in "Controlled Materials Plan—General Instructions on Bills of Materials."

The Class B products described under Group II are not to be listed on CMP-3.

Product Classification

Class B—Group I

*Aircraft equipment and components (selected).

Bearings, ball and roller (except main thrust bearings for ships)
Blowers (see fans, blowers, and exhausters)
Brake actuating mechanisms, air
Brakes, automotive—air and hydraulic
Burners, combination oil and gas—industrial
Burners, gas
Burners, oil—industrial
Busways and bus ducts

Capacitors, power (except radio and radar)
Capacitors, radio and radar
Carburetors (except aircraft)
Circuit breakers, air
Coaxial cable, radio frequency
Compressors and dry vacuum pumps, reciprocating—air and gas
Condensers, radio and radar
Condensers, steam—surface, jet and barometric (except pumps and instruments)
Condensers, synchronous and frequency changers (over 500 kilowatt capacity at 0.8 power factor)
Control valves and regulators, industrial type (for plant facilities, etc.)
Conveyors and conveying systems
Crystal assemblies, radio and radar

Electric motor control equipment (except gun fire controls and aircraft controls)
Engines, internal combustion
Exhausters (see fans, blowers, and exhausters)

Fans, blowers, and exhausters
Filters, radio and radar
Frequency changers (see condensers, synchronous)

Generators, electric (see motors and generators)
Generator sets, steam-turbine

Heat exchangers

Instruments, combat type (except fire-control equipment, aircraft and navigation instruments)
Instruments, industrial type (for plant facilities, etc.)

Microphones, radio and radar
Motors and generators, electric

Panel boards and distribution boards
Pressure vessels
Pulverizers, coal
Pumps, dry vacuum (see compressors)
Pumps, hand-operated
Pumps, reciprocating
Pumps, rotating

Rectifiers, mercury arc power
Regulators, induction type
Resistors, radio and radar

Sockets, radio and radar
Speakers, radio and radar
Speed changers, mechanical and hydraulic
Stokers, industrial (over 30 square feet grate area)
Switches, knife and enclosed
Switchgear
Test sets, standard, radio and radar
Transformers, power and distribution
Transformers—reactors, radio and radar (including coils and chokes, other than IF and RF)
Transformers, specialty (natural draft dry type)
Tubes, radio and radar
Turbines, gas
Turbines, hydraulic
Turbines, mechanical drive—steam
Turbo-blowers and turbo-exhausters, centrifugal—multistage
Turbo-blowers and turbo-exhausters, centrifugal—single stage
Turbo-blowers, turbo-exhausters, rotary

Vibrators, radio and radar

Wheel assemblies, automotive type

Class B—Group II

Abrasive products, manufactured (synthetic and natural)
Agricultural machinery as described in groups 1, 2, 3, 4, and 5 in WPB order L-170 (earthworking, fertilizing, spraying machinery, etc.)
Agricultural machinery as described in groups 6, 7, and 8 in WPB order L-170 (harvesting, haying machinery, etc.)
Agricultural machinery as described in groups 12 and 16 in WPB order L-170 (farm wagons and trucks, dairy equipment, etc.)
Agricultural machinery as described in groups 9, 13, 14, 15, 17, 18, and 19 in WPB order L-170 (farm elevators, barn yard and poultry farm equipment, irrigating equipment, farm pumps, etc.)
Air-conditioning equipment (see refrigeration)
Aircraft equipment and components (selected)
Alarm and signal systems, protective
Animal and fish oil machinery and equipment
Animal traps and cages
Anodizing equipment
Apparatus, laboratory (see instruments)
Apparel findings (see hooks and eyes)
Asbestos building materials
Asbestos textiles (metallic yarn, friction materials, mechanical packings, and gaskets)
Automotive accessories and replacement parts (except spare parts for military vehicles)
Automotive repair shop special machinery and equipment

Baby carriages and similar equipment
Bag filling and closing machines
Bag ties, metal
Bakery machinery
Barrels, steel (see drums)
Baskets and hampers, veneer
Batteries, dry cell
Batteries, storage
Bearings, journal and sleeve (see bushings)
Bedsprings and mattresses
Bells and gongs, non-electric
Bending machines—roll, plate, pipe, and other structural shapes
Bicycles
Blast detonating equipment
Boilers, low-pressure, cast-iron
Boilers, low-pressure, steel
Bolts, nuts, rivets (except aluminum), washers, screws, and pins (cotter, clevis, brake, knuckle, and taper)
Boring machinery, earth and rock (see drilling)
Bottling machines
Boxes, wooden, wire-bound
Boxes and crates, wooden, nailed
Boxes and drums, plywood
Brazing alloys
Broom, brush, and mopmaking machinery
Buckles (see hooks and eyes)
Building mesh, metal
Building products, nonmetallic mineral
Building products, sheet-metal (see sheet-metal building products)
Building products, structural metal (see structural metal building products)
Bunks and berths, metal
Burners, gas conversion (domestic)
Burners, oil (domestic)
Bushings, journal bearings and sleeve bearings
Buttons (see hooks and eyes)

Can making and can closing machines
Canning plant machinery
Cans, metal, as defined by WPB order M-81
Carbon brushes
Carbon products, industrial
Cars and locomotives, underground mine haulage
Case packers
Case sealing machines
Castings, iron
Ceramic manufacturing machinery
Cereal manufacturing machinery
Chains, except anchor
Chemical producing machinery, including bleaching machinery for fats and oils, chlorine cells, colloid mills, degreasing machinery, and electrolytic cells (for water decomposition)
Church goods
Clocks and watches, including chronometers
Closures, glass, home canning, as defined by WPB order M-104
Closures, glass, except home canning, as defined by WPB order M-104
Coal-cutting machines
Coils, blast heating
Cold cathode light systems (see fluorescent)
Collapsible tubes, including clips
Communication equipment—special military
Construction equipment, tractor mounted, including angledozers, bulldozers and power control units
Construction machinery, power cranes and shovels, draglines, buckets, stiff-leg derricks and dredges
Construction machinery, such as road brooms, concrete buggies and carts, bins, center line marking equipment, road discs, ditchers, aggregate dryers, joint and crack filling machinery, road forms, form tamping machines, mud jacks, portable snow loaders, tamping rollers, scarifiers, concrete towers, contractors' crawler wagons, and similar equipment
Construction machinery—scrapers, maintainers and graders
Construction machinery—winches and hoists, contractors' elevating
Construction material mixers, spreaders, pavers, surfacers, finishers, tampers, vibrators, and related construction machines
Construction material processing equipment, including asphalt plants and portable crushers
Containers, paper—consumer type, including paper bottles, milk bottle caps and closures, folding cartons (stitched), set-up boxes (stitched), and fiber cans (metal ends)
Convectors, heating
Conveyors, portable underground mine type
Cooking and heating appliances, commercial and domestic
Cooperage, slack
Cooperage, tight
Cork products, including lagging, pipe covering gaskets, and washers, daubers, textile cots
Cosmetics machinery (see drugs)
Cotton ginning and delinting machinery
Cranes, hoists and winches
Crates (see boxs)
Crowns, metal
Crushing and grinding machinery, stationary
Cutlery
Cut-outs and fuse links
Cylinders, gas, and ton containers

Dairy and milk products plant machinery
Dental instruments, apparatus and equipment
Dental supplies, and orthodontic appliances
Diamond dies
Die casting and moulding machines, metal
Dishwashing machinery
Doors and windows, metal
Drilling and boring machinery, earth and rock, including core drills, rock drills, pneumatic electric coal drills, churn drills, earth borers, and horizontal augers
Drilling equipment, oilfield, including rigs and accessories
Drilling machinery, water well
Drug, pharmaceutical, and cosmetics machinery
Drums and barrels, steel
Drums, fibre
Drums, plywood (see boxes)
Dry cleaning machinery, commercial (see laundry, dry cleaning, and press machinery)
Dry kilns and redriers
Dust collecting equipment, industrial

Electric lanterns, portable (see flashlight)
Electrical appliances, commercial
Electrical appliances, domestic
Electrical conduit and conduit fittings
Electrical connectors

Electroplating equipment
Elevators, ship (except for use on aircraft carriers)
Elevators, shore
Engineering instruments and equipment (including surveyors', drawing, and mathematical)
Envelopes and tablets, paper
Extruding machines

Ferro-cerium
Fertilizer machinery and equipment
Fibre drum making machinery
Fibrous glass products, including pipe insulation (moulded type 60), pipe insulation (blanket type), metal mesh blankets, and dust stop filter frames
Files and rasps
Fire apparatus, motorized and auxiliary
Fire extinguishers, portable; and stirrup pumps
Fire extinguisher systems, piped, and generator sets
Fire hose, hose dryers, racks, reels, and related products such as couplings, nozzles, and fittings
Fish oil machinery and equipment (see animal)
Fishing equipment, commercial
Flanges for steel shipping containers (see plugs)
Flashlight cases and portable electric lanterns
Floodlights and searchlights (under 12")
Floor finishing and floor maintenance machines
Fluorescent lighting fixtures and transformers, commercial and industrial and cold cathode lighting systems
Food preparation and serving fixtures, equipment and appliances, commercial
Forging machines
Foundry machinery, equipment and supplies
Furnaces, electric, metal-melting
Furniture, wooden
Fuse links (see cut-outs)
Fuses, under 2,300 volts

Gages and machinists' precision measuring tools
Generator sets, gas engine driven
Glue pots
Gongs (see bells)
Grinding machinery (see crushing)

Hairpins, bob pins, and hair curlers
Hampers, veneer (see baskets)
Hardware, builders'
Hardware, pole line
Hardware, transportation equipment
Hardware, except builders', transportation equipment and pole line
Heat-treating equipment, metal
Heating appliances (see cooking)
Heating equipment—warm air distribution equipment, registers, stove and smoke pipe
Heating equipment—warm air furnaces, including furnace burner units, as defined by WPB order L-22
Heating system controls, including thermostats
Hoists (see cranes)
Hoists, mine types
Hooks and eyes, slide and snap fasteners, buckles, buttons and miscellaneous apparel findings
Hospital beds, metal
Hot-water equipment, domestic (except electric)
Household articles as defined in WPB order L-30 (see kitchen)

Identification plates, badges, emblems, pin tickets and tags (except military)
Incandescent lighting fixtures
Infra-red heating and drying equipment (except physiotherapy heating units)
Instruments and apparatus, laboratory
Insulators for electric lines and equipment and communication equipment

Jewel bearings
Jewelry

Kitchen, household, and other miscellaneous articles as defined in WPB order L-30
Kits, shipping (see shipping)

Lamp bulbs and tubes, electric
Lamps, liquid fuel
Lamps, portable electric
Lanterns, electric (except portable electric lanterns)
Laundry, dry cleaning, and pressing machinery, commercial
Laundry machinery, domestic, as defined by WPB order L-6
Lawn mowers, hand and power
Leather working machinery
Lightning arrestors
Lighting equipment and accessories, airport
Lighting fixtures, special black-out and dim-out
Lighting fixtures street and highway; and traffic control signals
Lighting fixtures, marine
Locomotives, underground mine haulage (see cars)
Logging and sawmill machinery and equipment
Lubricating equipment, industrial

Machine tools, defined as non-portable, power-driven machines that shape metal by grinding or progressively cutting away chips
Machine tool and metal-working machinery attachments and accessories for work-holding devices and other aids to the process of metal cutting and forming
Machinists' precision measuring tools
Magnets, electrical lifting, 5" diameter and larger
Marking devices (see office supplies)
Mattresses (see bedsprings)
Meat packing house machinery
Medical instruments and equipment (see surgical)
Medical supplies (see surgical)
Metal-working machinery attachments and accessories (see machine tools)
Metal-working machines and tools, portable (power-driven)
Metallic tubing and hose, flexible
Meters, gas and water
Mine loaders, underground
Mirrors
Morticians' goods
Moulding machines, metal (see die-casting)
Musical instruments

Nails (except steel wire nails) and tacks
Needles, domestic; including crochet, hand sewing, knitting, and domestic sewing machines
Nibblers, power driven (see shears)
Nuts (see bolts)
Office machinery

Office supplies, including marking devices
Ophthalmic goods
Optical and ophthalmic goods making machinery
Ore dressing and coal preparation equipment, including classifiers; ore concentrators; sedimentation and conditioning equipment; and sizing equipment

Orthopedic appliances (see surgical)

Packaging machines, including combination packaging machines
Pails, shipping (see shipping)
Paint and varnish making machinery
Paper bag making machines
Paper can and tube making machines
Pens and pencils
Petroleum refinery machinery and equipment
Photographic equipment and accessories
Physiotherapy apparatus, electrical
Pins, common and safety
Pins; cotter, clevis, brake, knuckle, and taper (see bolts)
Pipe fittings, steel
Pipe fittings, except steel
Plastering bases and plastering accessories, metal
Plastic molding machinery
Plugs and flanges for steel shipping containers
Plumbing fixtures, fittings, and trim
Power cycles (except motorcycles)
Power-transmission equipment, mechanical
Presses, baling (except agricultural)
Presses, hydraulic and mechanical
Pressing machinery, commercial (see laundry machinery)
Printing trades machinery and equipment
Pumps, measuring and dispensing
Punches, power-driven (see shears)

Radiators, cast-iron
Railroad and transit maintenance-of-way work equipment
Railroad and transit signal equipment
Railroad and transit track equipment
Railroad car accessories (except air-brake actuating mechanisms)
Railroad locomotive accessories (except airbrake actuating mechanisms)
Rapid transit and street railway car accessories (except air-brake actuating mechanisms)
Rasps (see files)
Razors (except electric)
Razor blades
Refrigeration and air-conditioning equipment
Refrigerators, ice (domestic)
Rivets (see bolts)
Rolling mills and allied equipment
Rubber goods, mechanical (except tires and tubes)

Safety equipment, industrial, such as masks, inhalators, machine guards, industrial goggles, helmets, protective clothing and footwear
Salt-processing machinery
Sanitary ware
Saws (see tools)
Sawmill machinery (see logging)
Scales and balances
Screen cloth, insect—metal
Screws (see bolts)
Searchlights (see floodlights)
Sewer cleaning equipment and machinery
Sewing machines, industrial
Shears, punches and nibblers—power-driven
Sheet-metal building products
Shipping containers, corrugated and solid fiberboard
Shipping containers, fluid milk (including extra covers)
Shipping kits and pails, steel
Signal systems (see alarm)
Silverware, plated
Silverware, sterling
Slide and snap fasteners (see hooks and eyes)
Smelting and refining equipment (except furnaces)
Spark plugs
Sporting goods
Spraying equipment, industrial
Sprinkler systems, automatic
Stirrup pumps (see fire extinguishers)
Stokers, domestic (grate area 36 square feet or less)
Stoves, heating (domestic) including space heaters and floor and wall furnaces (except electric)
Stoves and ranges, cooking (domestic), including laundry stoves, hot plates, and portable ovens (except electric)
Strapping, metal, round and flat
Structural metal building products, fabricated
Sugar mill and refining machinery, cane and beet
Surgical and medical instruments and equipment
Surgical and medical supplies and orthopedic appliances

Tablets, paper (see envelopes)
Tacks (see nails)
Telegraph equipment, outside plant (see telephone)
Telegraph equipment (except outside plant)
Telephone and telegraph equipment, outside plant
Telephone equipment, central office
Telephone equipment, subscriber station
Textile machinery
Thermostats (see heating system controls)
Tires and tubes
Tire molds and tire mold inserts
Tire retreading, recapping, and repairing machinery and equipment
Tobacco manufacturing machinery and equipment
Ton containers (see cylinders)
Tools, edge; saws (except metal-cutting) and saw blades
Tools, hand, except mechanics' hand service tools
Tools, mechanics' hand service
Tools, metal-cutting (cutting agents to be used in conjunction with machine tools)
Tractors, industrial (see trucks)
Tractors, track-laying
Tractors, wheel type, as described in Group 10 of WPB order L-170
Traffic control signals (see lighting fixtures)
Trolley bus and motor bus accessories (except air-brake actuating mechanisms)
Truck and tractors, industrial—hand-operated, including trailers, platforms, dollies, casters, portable elevators (platform type)
Trucks and tractors, industrial—power-propelled
Tube cleaners
Tubes, electronic (except radio and radar)
Tube expanders
Tubes, rectifier (tungar, rectigon, and similar types)
Tubes, X-ray (see X-ray)

Umbrellas and parasols
Unit heaters and unit ventilators

Vacuum cleaners, industrial
Valves, steel
Valves, except steel
Varnish making machinery (see paint)
Vegetable oil machinery and equipment

Washers (see bolts)
Water purification equipment, except complete portable water-purification plants purchased by the Army and Navy
Welding equipment and apparatus, electric
Welding equipment and apparatus, nonelectric
Welding rods and electrodes (for gas welding and arc welding)
Winches (see cranes)
Windows, metal (see doors)
Wire-drawing machinery
Wire-working machinery
Wiring devices and supplies, electrical
Wooden box making machinery
Woodworking machinery, remanufacturing and fabricating (except container-making machinery)
Wrapping machines

X-ray apparatus and tubes

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*The following items under the heading "Aircraft Equipment and Components" in the list arranged by classes of products are Class B Group I: Bombing armament (all items); gunnery armament (all items); ordnance (both items); photographic cameras; instruments and instrument accessories (all items); pump assemblies (all items); pontoons and skis; bearings (antifriction); belts, safety; fire extinguishers and fire extinguishing accessories; oxygen equipment; rafts, life. All other items under this heading are Class B Group II.

Schedule 1 of Regulation 1

STEEL

Carbon Steel

Forms and shapes.
- Bars, cold finished.
- Bars, hot rolled.
- Ingots, billets, blooms, slabs, tube rounds, skelp and sheet and tin bar.
- Pipe.
- Plates.
- Rails and track accessories.
- Sheets and strip.
- Steel castings.
- Structural shapes and piling.
- Tin plate, terne plate, and tin mill black plate.
- Tubing.
- Wheels, tires and axles.
- Wire rods, wire and wire products.

Alloy Steel

Forms and shapes.
- Bars, cold finished.
- Bars, hot rolled.
- Ingots, billets, blooms, slabs, tube rounds, sheet bar.
- Pipe.
- Plates and structural shapes.
- Sheets and strip.
- Steel castings.
- Tubing.
- Wheels, tires and axles.
- Wire rods, wire, and wire products.

NOTE: Steel in any of the above forms and shapes constitute controlled materials, but allotments of steel are made in the terms of (1) carbon steel (including wrought iron) and (2) alloy steel, without further breakdown.

ALUMINUM

Forms and shapes.
- Rod, bar, wire and cable.
- Rivets.
- Forgings, pressings and impact extrusions.
- Castings.
- Shapes, rolled or extruded.
- Sheet, strip, plate and foil.
- Tubing.
- Ingot and powder.

NOTE: Allotments of aluminum are made in the forms and shapes specified above.

* * * *

Specific information with respect to coding and definitions may be found in "General Instructions on Bills of Materials."

COPPER

Brass Mill Copper Base Alloy Products

Forms and shapes.
- Ammunition cups, discs and slugs.
- Sheet and strip (other than cups and discs).
- Rods, bars, and wire (including extruded shapes not including slugs).
- Tubing and pipe.

Brass Mill Copper Products

Forms and shapes.
- Plate, sheets and strip.
- Rods, bars and extruded shapes (excluding wire bars and ingot bars).
- Tube and pipe.

Wire Mill Copper Products

Forms and shapes.
- Wire and cable (including copper content of insulated wire and cable).

Foundry Copper and Copper Base Alloy Products

Forms and shapes.
- Castings.

NOTE: Allotments of copper are made in the forms and shapes specified above.

Schedule 2 of Regulation 1

SCHEDULE II.—SHORT FORM OF ALLOTMENT

Allotment number	Controlled Material Products allotted		
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

Above allotments are made for use in filling this delivery order in compliance with CMP Regulation No. 1.

Instructions for Use of Short Form of Allotment

The above short form of allotment may be used by any consumer for the purpose of making an allotment to a secondary consumer producing Class A products for him. The short form of allotment must be either placed on or physically attached to the delivery order calling for delivery of the Class A products. If it is attached the delivery order number or other identification must be indicated on the form.

The form must be followed by the signature of an authorized official of the consumer making the allotment, but need not be separately signed if it is placed on the delivery order in such a position that the signature of the delivery order by such an authorized official clearly applies to the allotment as well as to the order itself.

The size of the form may be varied, but all information called for by the form must be supplied and the general arrangement and wording of the form must be followed.

Under the heading "Controlled Material Products Allotted" the person making the allotment must designate the forms which are allotted. These must be shown in the breakdown prescribed in Schedule I of CMP Regulation No. 1, and must be within the allotments received by such consumer for the same forms. Additional columns may be added depending on the number of forms of controlled material allotted. A sample form follows:

	Controlled Material Products allotted			
Allotment number	Carbon steel Tons	Copper base alloy tubing and pipe Lbs.	Copper plate sheets and strip Lbs.	Aluminum castings Lbs.
N-1-16	100	10,000	8,000	100

Above allotments are made for use in filling this delivery order in compliance with CMP Regulation No. 1.

TIME FOR PLACING CONTROLLED MATERIAL ORDERS

Note: Delivery orders may be placed in advance of receiving allotments, and converted into authorized controlled material orders on receipt of allotments, as provided in paragraph (a) (6) of CMP Regulation No. 1.

Schedule III under CMP Regulation No. 1

STEEL

Product	*No. of days in advance of 1st day of month in which shipment is required*
Alloy steel (including stainless steel):	
Hot rolled bars and semi-finished	75
Bars—cold finished	105
Sheet and strip—hot and cold rolled	105
Plates—hot rolled	75
Tool steel:	
Hot rolled products	90
Cold finished products	120
Cold finished bars:	
Carbon bars—standard sizes, grades and sections	70
Carbon bars—furnace treated at hot mills or special section, odd sizes or special grades	100
Alloy bars	105
Plates and shapes:	
Carbon steel plates	30
Carbon steel structural shapes	45
Alloy steel plates and shapes	75
Pipe	30
Sheet and strip:	
Sheet—hot rolled — 16-gauge and heavier	30
Sheet — hot rolled — 17-gauge and lighter	45
Sheet—cold rolled—galvanized—long terne	45
Strip—hot rolled (low carbon)	30
Strip—cold rolled (low carbon)	45
High carbon cold rolled strip (over .25 carbon) and other long processed special carbon hot rolled and cold rolled sheets and hot and cold rolled strip (including electrical grade)	60
Hot rolled carbon bars and semifinished:	
Except for carbon bars—heat-treated and annealed	30
Carbon bars heat treated and annealed	60
Tin mill products	30
Tubing:	
Carbon steel—hot finished	30
Carbon steel—cold drawn:	
1½" and larger	45
Under 1½"	75
Alloy steel—hot finished	90
Alloy steel—cold drawn:	
1½" and larger	110
Under 1½"	120
Steel castings:	
Providing patterns are available:	
Weight per casting:	
500 pounds and under	30
Over 500 pounds to 5000 pounds	45
Over 5000 pounds to 30,000 pounds	60
Over 30,000 pounds	75
Wire and wire products:	
Hot rolled wire rods	30
Merchant trade products	30
Manufacturing wires:	
Low carbon .0475" and heavier	45
Low carbon under .0475"	60
High carbon (0.40 carbon and higher) .0475" and heavier	45
Under .0475" to .021"	60
Under .021"	75
Wire rope and strand:	
⅝" dia. and over	75
9/16" dia. and under	105
Welded wire-reinforcing fabric	45

COPPER

Brass mill copper and copper base alloy products:	
Copper and non-refractory alloys	45
Refractory alloys	60
Wire and cable products:	
Bare wire and cable	10
Weatherproof wire and cable	14
Magnet wire	25
Rubber insulated building wire	30
Paper and lead cable	40
Varnished cambric cable	30
Asbestos cable (type H-F)	60
Rubber insulated wire and cable (mold or lead cured)	45
Foundry copper and copper base alloy products:	
Castings (rough castings, not machined—assuming patterns are available)	
Small simple castings to fit 12" by 16" flask	7
Large intricate and centrifugal castings	14

ALUMINUM

All forms and shapes	45

* * *

Where no time is specified in Schedule III for placing orders for a particular form or shape of controlled material, the time for placing such orders shall be subject to agreement between the consumer and the controlled materials producer, provided that no producer shall discriminate between consumers in the acceptance of orders. In the event of any disagreement, the matter should be referred to the appropriate Controlled Materials Division.

MINIMUM MILL QUANTITIES

Schedule IV under CMP Regulation No. 1

STEEL

Product	**Size and grade for shipment at one time, to one destination*
Alloy steel:	
Standard grades and sections:	
Rounds, squares 3" and under	5 NT
Hexagon and flats—all sizes	5 NT
Tool steel	500 lb.
Cold finished bars	3 NT
Hot rolled carbon bars and semifinished:	
Round bars up to 3" incl., and squares, hexagons, half rounds, ovals, half ovals, etc., of approximate equivalent sectional area	5 NT
Round bars over 3" to 8" (including squares within this range)	15 NT
Flat bars, all sizes	5 NT
Bar size shapes (angles, tees, channels and zees under 3")	5 NT
Forging billets, blooms and slabs	(†)
Rerolling billets, slabs, sheet bars, skelp	25 GT
Plates and shapes:	
Plates:	
Continuous strip mill production	10 NT
Sheared mill, universal mill or bar mill production	3 NT
Structural shapes	5 NT
Pipes	(‡)
Sheet and strip:	
Sheets—hot and cold rolled	5 NT
Strip—hot and cold rolled	3 NT
Tin mill products (one gauge)	5000 lb.
Tubing:	
Carbon and alloy steel—cold drawn:	
O.D. (inches):	
Up to ¾" inclusive	1000 ft.
Over ¾" to 1½" inclusive	800 ft.
Tubing:	
Carbon and alloy steel:	
Cold drawn or hot finished:	
Over 1½" to 3" inclusive	600 ft.
Over 3" to 6" inclusive	400 ft.
Over 6"	250 ft.
Wire and wire products:	
Hot rolled wire rods	5 NT
Merchant trade products (Assorted Merchant Products)	5 NT
Manufacturing wires (wires for further fabrication):	
Low carbon	1 NT
High carbon (0.40 carbon and higher) .0475" and heavier	1 NT
Under .0475" to .021"	1000 lb.
Under .021"	500 lb.
Wire rope and strand	1000‡
Welded wire reinforcing fabric	(†)
Rails and track accessories:	
Guard rail clamps, clip bolts, nut locks, S-irons, rail braces	3 NT
Track spikes, track bolts, screw spikes, rail clips, gage rods	5 NT
Rail anchors	15 NT

COPPER

Brass mill products	200 lb.
Wire mill products	300 lb.

ALUMINUM

Sheet and strip	500 lb.
Tubing	250 lb.
Extrusions	200 lb.
Wire, rod and bar	200 lb.
Rivets	50 lb.

[1] Published carload minimum (mixed sizes and grades).

[2] Pull rolls of manufacturer's standard stock sizes.

* NT—Net tons; GT—Gross tons.

† Product of one ingot.

‡ Feet lengths.

PREFERENCE RATINGS UNDER MRO REG. NO. 5A

List A

The following items are excluded from maintenance, repair and operating supplies as defined in paragraphs (b) (3), (b) (4) and (b) (5) of CMP Regulation No. 5A regardless of whether they would otherwise come within such definitions.

1. Fabricated containers (in knock-down or set-up form, whether assembled or unassembled), required for packaging products to be shipped or delivered.
2. Printed matter and stationery.
3. Paper, paperboard, and products manufactured therefrom; molded pulp products.
4. Fuel or electric power.
5. Office machinery or office equipment.
6. Clothing, shoes or other wearing apparel, if made of leather or textiles, except that the following types may be included in operating supplies when specially designed and used to furnish protection against specific occupational hazards (other than weather):
   a. Asbestos clothing,
   b. Safety clothing impregnated or coated for the purpose of making the same resistant against fire, acids, other chemicals or abrasives,
   c. Safety industrial rubber gloves and hoods and linemen's rubber gloves and sleeves,
   d. Gauntlet type welders' leather gloves and mittens, and electricians' leather protector or cover gloves,
   e. Other safety leather gloves or mittens but only if steel stitched or steel reinforced,
   f. Safety industrial leather clothing other than gloves or mittens,
   g. Metal mesh gloves, aprons and sleeves,
   h. Plastic and fibre safety helmets,
7. Fire hose, hose dryers, racks, reels and related products.
8. Fire extinguishers.
9. Any device, equipment, instrument, preparation or other material designed or adapted for use in connection with
   a. air raid warnings or detection of the presence of enemy aircraft; or
   b. blackouts or dimouts; or
   c. the protection of civilians, either individually or collectively, against enemy action or attack.

Schedule I

PREFERENCE RATING AA-1

Sewers—sanitary and sewage disposal.
Hospitals.
Refuse collection and disposal.
Communicable disease control.
Alcan, Panamerican and Trans-Isthmian highways.
Public transportation facilities.
Docks, wharves and terminals.
Police and law enforcement agencies.
Fire protection.
Beacons, markers, and radio devices employed as aids to navigation.

Schedule II

PREFERENCE RATING AA-2X

Streets and highways providing immediate access to military or war production facilities, and the strategic network and its extensions into and through municipalities.
Federal aid system of highways.
Primary state highways, together with their extensions into and through municipalities and arterial streets and highways.
Airports and flight strips.
Dams, levees and revetments.
Canals—waterways.
Flood control facilities.
Storm sewers.
Public dispensaries, clinics and health stations, governmentally-owned or operated not for profit.
Penal institutions including prison industries.
Mine safety.
Printing and publishing.
United States Mint.
United States Bureau of Printing and Engraving.
Processing, warehousing, distribution, preparation, serving and inspection of food by Governmental agencies only.
Over-all administration including staff services, such as fiscal, procurement, personnel, etc., by Governmental agencies only.
Repairs made necessary by reason of any breakdown of plumbing, hating, electrical wiring or equipment, or elevator service in any building or to provide against imminent breakdown of any such facilities by Governmental agencies only.
Educational institutions.

PREFERENCE RATINGS UNDER MRO REGULATION NO. 5

List A

The following items are excluded from the definition of "operating supplies" in paragraph (b) (2) of CMR Regulation No. 5, regardless of whether normally carried as such according to established accounting practice:

1. Fabricated containers (in knock-down or set-up forms, whether assembled or unassembled), required for packaging products to be shipped or delivered.
2. Printed matter and stationery.
3. Paper, paperboard, and products manufactured therefrom; molded pulp products.
4. Fuel or electric power.
5. Office machinery or office equipment.
6. Clothing, shoes or other wearing apparel, if made of leather or textiles, except that the following types may be included in operating supplies when specially designed and used to furnish protection against specific occupational hazards (other than weather):
   a. Asbestos clothing.
   b. Safety clothing impregnated or coated for the purpose of making the same resistant against fire, acids, other chemicals or abrasives.
   c. Safety industrial rubber gloves and hoods and lineman's rubber gloves and sleeves.
   d. Gauntlet type welders' leather gloves and mittens, and electricians' leather protector or cover gloves.
   e. Other safety leather gloves or mittens, but only if steel stitched or steel reinforced.
   f. Safety industrial leather clothing other than gloves or mittens.
   g. Metal mesh gloves, aprons and sleeves.
   h. Plastic and fibre safety helmets.
7. Automotive replacement parts.
8. Automotive maintenance equipment.
9. Cellophane and similar transparent materials derived from cellulose having a gauge of less than .003 inch and cellulose caps or bands of any gauge.

SCHEDULE I—PREFERENCE RATING—AA-1

Manufacture of the following:

Unfabricated and semifabricated products:
- Aluminum and aluminum alloy semi-finished products.
- Copper and copper alloy semifinished products.
- Ferro-alloys.
- Iron unfabricated and semifabricated products, including: forgings, pig iron, pipe, wire, wrought iron and foundry products.
- Magnesium and magnesium alloy semifabricated products.
- Nonferrous metal unfabricated and semifabricated products.
- Steel unfabricated and semifabricated products, including: bars, forgings, pipe, rolling mill and foundry products, sheets, strips, structural steel, tubing, and railroad rails, frogs, switches and crossings.

Iron and steel finished products:

Aircraft landing mats; Boiler-shop products, including: boilers, gas cylinders, steam condensers and tanks; Bolts; Cooking ranges and stoves, except electric; Fabricated pipe; Furnaces, including: heating stoves and related equipment; Hand tools, except farm and garden; Metal barrels, drums, kegs and shipping pails; Nuts; Rivets; Saws; Screws; Steel springs; Stove pipe; Thermostats and other temperature control devices; Transportation-equipment hardware; Washers; Water heaters, tanks and boilers.

Chemical products:

Acids; Alcohols; Alkalies; Basic chemicals and intermediates; Coal tar and coal tar derivatives; Compressed and liquid gases; Dyes, colors, and pigments; Fats and oils (industrial only); Lacquers; Organic and inorganic chemicals; Paints; Plastics and synthetic resins; Soap; Solvents; Varnishes.

Industrial machinery and equipment:
- Chemical manufacturing machinery and equipment.
- Compressors.
- Conveying machinery and equipment.
- Cranes, derricks, hoists and winches.
- Electric furnaces.
- Electrical industrial equipment.
- Excavating machinery.
- Fans and blowers (industrial).
- Food-dehydration machinery.
- Furnaces and ovens (industrial).
- Gas generating equipment and apparatus.
- Heat exchangers.
- Industrial lubricating equipment.
- Industrial machine-shop products.
- Industrial trucks and tractors.
- Instruments (industrial)
- Machine tools and metal-working machinery, including: bending, forging, cutting, shearing, rolling, milling and pressing machinery.
- Mechanical power-transmission equipment.
- Mining machinery and equipment.
- Ore milling, smelting and refining equipment.
- Petroleum refining equipment.
- Plastic working machinery.
- Pumps.
- Rubber-working machinery.
- Stone, clay, and glass products manufacturing machinery.
- Vacuum pumps.
- Welding equipment, gas and electric, including welding rods and electrodes.
- Well-drilling machinery.
- Woodworking machinery (except cooperage and wooden box making machinery).

Direct-military products:
- Aircraft, propellers, engines and parts.
- Ammunition.
- Ammunition boxes and chests.
- Combat vehicles.
- Explosives.
- Ordnance.
- Pyrotechnics.
- Ships, equipment and parts, including vessels of all types.
- Tanks, engines and parts (combat).

Electrical products:

Electrical carbon and graphite products, electric motors and generators, electrical instruments, floodlights, fuses, insulated wire and cable, motor-generator sets, physical-therapy equipment, pole-line hardware and insulators, searchlights, spotlights, storage batteries, switchgear, transformers, wiring devices and conduits, X-ray equipment.

Engines and turbines:

Diesel engines, gasoline engines, hydro turbines, steam engines and turbines.

Communication equipment:

Communication equipment including telephone and telegraph systems and apparatus, fire alarm systems, phonographs, radio and radar equipment and tubes, railroad signals and accessories.

Transportation equipment:

Bicycles and parts, locomotives, diesel, electric and steam, motorcycles, side cars and parts, railroad and street cars.

Miscellaneous products:
- Abrasive wheels, stones, papers and cloths.
- Agricultural machinery, implements and equipment.
- Air conditioning and commercial refrigeration equipment (mechanical).
- Closures (pressed paper and molded plastic).
- Elevators.
- Escalators.
- Fishing equipment (commercial).
- Glass containers.
- Jewel bearings.
- Laundry equipment (domestic).
- Motor vehicles, engines and parts (commercial).
- Navigation instruments.
- Optical instruments and lenses.
- Photographic apparatus.
- Professional, scientific and engineering instruments and appliances.
- Refractories.
- Refrigerators (mechanical).
- Rubber and rubber products (natural and synthetic).
- Safety equipment, including helmets, goggles and Civilian defense items.
- Stokers.
- Tires and tubes.
- Tractors.
- Valves, faucets and fittings.
- Wooden, paper and fiber containers.

Persons engaged in the following industries:
- Analytical, research, testing, and control laboratories.
- Discovery, production, transportation, refining and marketing of natural gas, petroleum and petroleum products.
- Electroplating, galvanizing and other metal coating.
- Gas, light, power, water, central heating, and sanitary services.
- Industrial food production, processing, packaging, preservation and storage.
- Mining and quarrying.
- Public transportation and terminal facilities including stevedoring.
- Ship repair and maintenance.
- Smelting.
- Wire communications industry.

SCHEDULE II—PREFERENCE RATING AA-2X

Manufacture of the following:

Iron and steel finished products:
- Boilers and radiators (heating).
- Cutlery.
- Fabricated iron and steel wire products.
- Gas conversion burners.
- Hardware except transportation-equipment hardware.
- Kitchen and household cans and pails.
- Lawn mowers.
- Metal bottle caps and closures, except beverage crowns.
- Metal cans.
- Metal doors, window sash, frames, molding and trim.
- Metal furniture.
- Metal sanitary ware.
- Milk cans (bulk).
- Razors.
- Screens and weatherstripping.
- Steamtables and restaurant equipment.
- Tools, farm and garden.
- Vitreous enameled products.

Non-ferrous metal products:
- Clocks.
- Collapsible tubes.
- Insignia.
- Pins, needles, hooks, eyes, snaps, buckles and fasteners.
- Time stamps and recording machines.
- Watches.

Non-metallic products:
- Lumber, logs, ply-wood and veneer.
- Non-metallic sanitary ware.
- Textiles, clothing and leather goods.

Industrial machinery and equipment:
- Business machines.
- Construction material.
- Cooperage and box making machinery.
- Food-processing machinery and equipment, except dehydration equipment.
- Laundry and dry-cleaning equipment.
- Leather working machinery.
- Metal container making machinery.
- Printing machinery.
- Pulp and paper machinery.
- Scales.
- Spraying equipment (industrial).
- Textile machinery.
- Water treatment equipment.

Electrical products:

Dry cell batteries, electric bulbs and tubes, electric ranges, electric sound signalling devices, lighting fixtures.

Fire protection equipment:

Fire engines, fire extinguishers, fire hose and related equipment, hydrants and related equipment, sprinkler systems.

Transportation equipment:

Busses, trailers (passenger-car).

Miscellaneous products:

Automotive testing equipment and instruments, baby carriages, church goods, drugs and medicinals, ice refrigerators, mattresses and bed springs, motion picture products, musical instruments, ophthalmic goods, pens and pencils and related office supplies, photographic accessories, plumbers specialties, pulp and paper, sewing machines, signs, umbrellas and parasols, ventilating fans.

Other products:

Other direct military products, manufacturing and construction equipment, components of products listed elsewhere, and other construction materials.

Persons engaged in the following industries:

Aeronautics training (civilian), civil air patrol, commercial refrigeration and production of ice, construction, engraving on metal (except for printing), metal scrap salvage, sorting and processing of metal scrap, printing and publishing, public warehouses, radio communication and broadcasting, repair services for industrial and household equipment (motor and mechanical).

Controlled Materials Classification

ALUMINUM PRODUCT CLASSIFICATION

CMP Materials Code Number		Code in Official Classification List of Raw and Basic Industrial Materials
	Bar and rod (excluding requirements for stock for wire, forgings, rolled structural shapes, and electrical cable)	201-02
	By sizes [Maximum diameter (for rounds and ovals). Maximum distance between faces (for squares, hexagonals, octagonals and rectangles)]:	
4021	⅜"-¾" inclusive; 4031 Over ¾"-1⅝" inclusive; 4041 Over 1⅝"-3" inclusive; 4051 Over 3".	
4121	Wire, excluding rivet wire.—Wire covers maximum diameters under ¾" in rounds, ovals, squares, hexes, octagonals, and rectangles	201-05
4122	Rivets	201-05
4151	Cable (electrical transmission only)	201-06
4171	Forgings and pressings (before machining)	201-09
	Castings from high-grade ingot* (before machining):	
4202	Cylinder heads for air-colled radial engines	201-11
4203	Other heat treated sand castings	201-11
4204	Non-heat treated sand castings	201-12
4205	Heat treated permanent mold castings	201-13
4206	Non-heat treated permanent mold castings	201-14
4207	Cold-chamber die castings	201-15
4208	Gooseneck die castings	201-15
	Castings made from low-grade ingot* (before machining):	
4213	Heat treated sand castings	201-11
4214	Non-heat treated sand castings	201-12
4215	Heat treated permanent mold castings	201-12
4216	Non-heat treated permanent mold castings	201-14
4217	Cold-chamber die castings	201-15
4218	Gooseneck die castings	201-15
4251	Rolled structural shapes (angles, channels, zees, tees, etc.)	201-22
	Extruded shapes	
4301	2S, 3S, 53S, and 61S alloys	201-27
4311	All alloys except, 2S, 3S, 53S, and 61S	201-28
	Sheet, strip and plate—excluding stock for foil, impact extrusions, and forgings	
	*Metallic content of alloys must be computed.	
4351	2S and 3S alloys	201-37
4361	Alloys other than 2S and 3S	201-38
	Tubing	
4401	2S and 3S alloys	201-46
4411	Alloys other than 2S and 3S	201-47
4501	Powder	201-51 201-52 201-53 201-54 201-55
4601	Foil (.005" and thinner)	201-71
4701	Impact extrusions	201-73
	Ingot—excluding ingot for aluminum castings, sheet, plate, strip, rod, bar, extrusions, and powder	201-19
4801	High grade*	
4811	Low grade*	

*Low grade ingot means any aluminum which contains copper in excess of 4% by weight, and either iron or zinc in excess of 1% by weight.

COPPER PRODUCT CLASSIFICATION

	Brass Mill Products	
	(A) Copper Base Alloys	
3001	Ammunition Cups, discs and slugs	no number
3011	Sheet and strip (other than cups and discs)	206-32 207-32 222-32
3021	Rods, bars, and wire (including extruded shapes, not including slugs)	206-04 206-08 206-23 207-04 207-08 207-23 222-02 222-05 222-23
3041	Tubing or pipe	206-41 206-42 206-43 207-41 207-42 207-43 222-40 241-00 (1)
	(B) Copper	
3051	Plate, sheets and strip	212-32
3061	Rods and bars, including extruded shapes (not including wire bars and ingot bars)	212-19
3071	Tube and pipe	212-41 212-42 212-43
	Wire Mill Products	
	Copper	
3101	Wire and cable (including copper content of insulated wire and cable)	212-08
	Foundry Products	
	Copper and Copper Base Alloys	
3201	Castings	206-10 207-10 212-10 222-10

*Summarizations on basis of these codes should avoid duplication. Cupro-nickel (code 241-00 in Official Classification List of Raw and Basic Industrial Materials) should be divided into appropriate shapes under Brass Mill Products—Copper Base Alloys.

COPPER DEFINITIONS

A brass mill product means sheet, wire (other than electrical), rod or tube made from copper or copper base alloy.

A wire mill product means bare or insulated wire or cable for electrical conduction made from copper.

A foundry product means cast copper or copper base alloy shapes or forms suitable for ultimate use without rolling, drawing, extruding. The process of casting includes the removal of gates, risers and sprues, and sand blasting, tumbling or dipping, but does not include any further machining or processing.

Copper base alloy means any alloy in the composition of which the percentage of copper metal by weight equals or exceeds 40% of the total weight of the alloy.

Gross weight of copper or copper base alloy product is defined as the weight of the product delivered from a brass mill, wire mill or foundry.

Net weight of copper or copper base alloy product is defined as the weight of the material in the finished item.

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
5615	Beryllium	204-00 204-91 204-92 204-93
5715	Cadmium	208-19 208-91 208-92 208-93
5815	Cobalt other than in steel	210-00 210-91 210-92 210-93
6515	Mercury	218-00 218-91 218-92
5800	Mica	354-80 354-81 354-82 354-83 354-84 354-85 354-86 354-87 354-88 354-89 355-80 355-81 355-82 355-83 355-84 355-85 355-86 355-87 355-88 355-89
6615	Monel—Natural	220-02 220-05 220-10 220-20 220-33 220-40
6715	Nickel—other than in steel	221-02 221-05 221-10 221-20 221-33 221-40 221-91 221-92 221-93 221-98
6915	Tin—Other than on tin plate	229-20 229-71 229-91 229-92 229-98
7015	Tungsten—other than in steel	231-00 231-50 231-91 231-92 231-93

*Summarizations on basis of these codes should avoid duplication.

MAGNESIUM PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
5001	Extrusions: excluding extruded stick and forging stock	217-02 217-23 217-45
5051	Forging, before machining	217-09
5101	Sand Castings, heat treated, before machining	217-11
5111	Sand Castings, not heat treated, before machining	217-12
5201	Permanent and semi-permanent mold castings, heat treated, before machining	217-13
5211	Permanent and semi-permanent mold castings, not heat treated, before machining	217-14
5301	Die Castings, before machining	217-15
5401	Ingot and extruded stick, excluding requirements for ingot for magnesium; castings; extrusions; sheet, strips, and plate; and powder	217-19 217-75
5501	Sheet, strip, plate	217-30
5601	Powder	217-81 217-82 217-83 217-84 217-85 217-86 217-87 217-91 217-92 217-98 217-99

ZINC PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
	Zinc	234-05 234-10 234-19 234-33 234-59 234-91 234-92 234-93 234-94
	By grades:	
7115	Special high grade, high grade and intermediate—zinc content of 99.5% or higher	No number
7117	Brass special, selected, and prime Western	No number

*Summarizations on basis of these codes should avoid duplication.

STEEL PRODUCT CLASSIFICATION

CMP Materials Code Number		Code in Official Classification List of Raw and Basic Industrial Materials
	Carbon Steel (Grades 00, 10, 11 and 13)	
2001	Bars, cold finished	103-85
		103-86
		103-87
2005	Bars, hot rolled	103-81
		103-82
		103-83
		103-84
		125-81
2011	Ingot, billets, blooms, slabs, tube rounds, skelp and sheet and tin bar	119-00
		161-00
		189-00
2016	Pipe	145-86
		145-87
		145-88
2021	Plates	135-81
		135-82
		135-83
		135-84
		135-85
		135-86
		135-87
2026	Rails and track accessories	162-81
		162-89
		164-00
2031	Sheets and strip	131-80
		131-81
		131-82
		131-83
		131-84
		131-85
		131-86
		131-87
		131-88
		131-89
		131-90
2036	Steel Castings	110-81
		110-82
		110-83
		110-89
2041	Structural shapes and piling	125-82
		125-83
		163-81
		163-82
2046	Tin plate, terne plate, and tin mill black plate	165-00
2051	Tubing	145-80
		145-81
		145-82
		145-83
		145-84
		145-85
2056	Wheels and axles	167-00
2061	Wire rods, wire, and wire products	105-81
		105-82
		105-83
		105-84
		105-85
		105-86
		105-89
	Alloy Steel—Including Stainless (all other grade codes)	
2501	Bars, cold finished	103-85
		103-86
		103-87
2505	Bars, hot rolled	103-82
		103-83
		103-84
2511	Ingots, billets, blooms, slabs, tube rounds, sheet bar	119-00
		139-00
		161-00
2516	Pipe	145-86
		145-87
		145-88
2521	Plates	135-81
		135-82
		135-83
		135-84
		135-85
		135-86
		135-87
2531	Sheets and strip	131-80
		131-81
		131-82
		131-83
		131-84
		131-85
		131-86
		131-87
		131-88
		131-89
2536	Steel castings	110-81
		110-82
		110-83
		110-89
2551	Tubing	145-80
		145-81
		145-82
		145-83
		145-84
		145-85
2556	Wheels and axles	167-00
2561	Wire rods, wire, wire products	105-81
		105-86

DEFINITIONS

Carbon Steel:

All Steel other than alloy steel.

Alloy Steel:

Steel is classified alloy when the maximum of the American Iron and Steel Institute standard ranges given for alloying elements exceeds one or more of the following limits:

Manganese in excess of 1.65% maximum;
Silicon in excess of 0.60% maximum;
Copper in excess of 0.60% maximum;
Aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium, or any other alloying element in any amount specified or known to have been added to obtain a desired alloying effect.

Bars, Hot Rolled:

Concrete Reinforcing Bars.—These are hot rolled from billet steel, rail steel, or steel axles, and are further described as plain or deformed bars, used to resist tension, compression, or shear forces in concrete.

All Other.—These include rounds, half rounds, ovals, half ovals, squares, flats, hexagons, octagons, special sections and angles, channels, tees and zees, under 3" maximum cross-sectional dimension but excluding angles, tees, zees, channels and beams 3" and larger in maximum cross-sectional dimensions (see Structural Shapes below). Hot rolled bars are produced from billets or blooms to specified dimensions within standard tolerances without subsequent processing of the bars for accuracy or surface polish. They are commonly cut into straight lengths but in small sizes may be produced in coils.

For complete details as to description of hot rolled carbon steel bars and alloy steels see Steel Products Manuals covering these products, issued by the American Iron and Steel Institute.

Bars, Cold Finished.—Cold finished steel bars are produced from hot rolled material by several cold finishing processes, for the purpose of removing decarburization, improving surface finish, dimensional accuracy, alignment, or machinability; also in the case of cold drawn and cold rolled material, to increase the yield strength and tensile strength. Cold reduction processes and surface improvement processes used singly or in combination include cold drawing, cold rolling, turning, grinding, polishing, and straightening.

Semi-Finished Steel:

Ingots.—Ingots are steel castings of different shapes and sizes in an unworked condition and of suitable form for subsequent working by rolling or forging.

Blooms, Billets, and Slabs.—Are hot-rolled or forged from ingots to approximate cross-sectional dimensions with rounded corners.

Forging Quality Blooms, Billets, and Slabs; Squares not less than 4 x 4" cross section dimension. Rectangles other than squares minimum cross sectional area 16 square inches; minimum thickness 2".

For complete details as to description of semi-finished products see Steel Products Manuals covering Carbon Steel Semi-finished Products and Alloy Steels, issued by the American Iron and Steel Institute.

Tube Rounds.—Rounds used for manufacturing seamless pipe and tubing.

Skelp.—Flat rolled steel used for the manufacture of welded pipe.

Sheet and Tin Bar.—Slabs used for re-rolling into sheets and tin plate.

Pipe:

Standard.—Standard pipe is used for conveying air, gas, steam, water, oil, and other fluids for miscellaneous purposes at relatively low pressures.

Line.—Line pipe is used for distance transportation of water, gas or oil.

Oil Country Goods.—Oil Country Goods is a collective term applied in the oil and gas industries for three kinds of pipe used in wells; namely, casing, tubing and drill pipe.

Plates:

Comprise that group of flat, hot rolled, finished steel products which includes:

$\frac{3}{16}$" (0.1875 in.) or thicker, over 48" wide, for carbon steel.
$\frac{3}{16}$" (0.1875 in.) or thicker, over 10" wide, for stainless steel.
$\frac{1}{4}$" (0.250 in.) or thicker, over 6" wide, for carbon steel.
$\frac{1}{4}$" (0.250 in.) or thicker, over 12" wide, for alloy steel (except stainless).
7.65 lb. per square foot or heavier, over 48" wide, for carbon and alloy steel.
10.2 lb. per square foot or heavier, over 6" wide, for carbon steel.
10.2 lb. per square foot or heavier, over 12" wide, for alloy steel.

Plates are produced either from slabs or direct from ingots by hot-rolling. They are termed sheared plates or sheared mill plates when rolled between horizontal parallel rolls only, and trimmed on all edges. They are termed universal plates or universal mill plates (abbreviated U. M. plates) when rolled between horizontal and vertical parallel rolls, and trimmed on the ends only.

Rails and Track Accessories:

Includes rails, angle bars, fish bars, fish plates, rail joints, splice bars, clip bolts, cut track spikes, frogs and switches, gage rods, guard rail clamps, guard rails, nut locks, rail anchors, rail clips, screw spikes, switch stands, tie plates, track bolts, S-irons and rail braces.

Sheets and Strip:

This group comprises: Flat rolled carbon products which include .2499" to and including .2030" thick, over 6" to and including 48" wide; .2029" to and including .1875" ($\frac{3}{16}$") thick to and including 48" wide; under .1875" thick, any width mill can produce;

Stainless flat rolled products up to but not including .1875" ($\frac{3}{16}$") thick, any width;

Alloy flat rolled (except stainless) products up to but not including $\frac{1}{4}$" thick, any width.

Steel Castings:

Cast steel is steel that is poured into and allowed to solidify in metal or refractory moulds. Steel castings are any cast steel objects that do not require further mechanical working.

Structural Shapes and Piling:

Structural Shapes.—General term applied to flanged sections (3" and over cross-sectional dimension), including Channel, I, L, Z, or T shapes, for construction of buildings, bridges, ships, transmission towers, railroad cars and many other structural purposes.

(1) American Standard Sections is the designation applied to the series of I-beams, channels, and large angles originally established in 1896 by the Association of American Steel Manufacturers.

(2) Wide Flange Sections are those I- and H-shaped beams and columns that are rolled on mills having both vertical and horizontal rolls, by which method it is possible to produce flanges much wider than those of the standard beams, with inside and outside faces of the flanges parallel or with a very slight taper on the inside face.

Piling.—Steel sheet piling consists of rolled steel shapes having interlocks along two opposite edges rolled integrally, for the purpose of interlocking the edges of each unit to the edge of adjacent similar unit in order to create a continuous steel wall.

Tin Plate, Terne Plate, and Tin Mill Black Plate:

Includes hot rolled, cold rolled, hot dip and electrolytic tin and terne plate. Tin mill black plate is a flat rolled product .0141" and thinner in thickness, over 12" to 32" inclusive wide.

Tubing:

Mechanical.—Welded or seamless in standard or special shapes and sizes to standard or special tolerances, hot finished or cold drawn, used for a variety of mechanical purposes without being hydrostatically tested.

Pressure.—Include boiler tubing and other tubing subject to heat and pressure; tubing of various types subject to water and steam, internal and external pressure at elevated temperatures. Sizes refer to actual outside diameter and minimum wall thickness.

Wheels and Axles:

Wheels.—Wrought steel wheels are steel wheels for railroad and transit service, formed by heating steel blocks to a malleable condition and subsequently forming to size by a series of forging and rolling operations.

Axles.—A steel axle is a special shaft or spindle on which a wheel is mounted, that is made from a bloom or billet heated to a malleable condition and subsequently forged to desired shape.

Wire Rods, Wire, and Wire Products:

Includes wire rods, drawn wire, barbed and twisted wire, woven wire fence, wire nails and staples, wire bale ties, wire rope and strand, welded fabric, and all other wire products.

Examples for Use in Determining Gross Weight

Forgings.—Weight of billet, bloom, or bar used to produce forging, including allowance for bar ends, etc.

Castings.—Rough casting weight before machining, less sprues, risers, etc.

Parts made from Sheet or Plates.—Weight of sheet or plate required to make the specified part. Where more than one piece is obtained from a sheet or plate, the weight should be distributed according to the amount of material used to produce each piece.

Class B Product Symbols

A set of Class B Product Symbols has been assigned to items falling within the jurisdiction of the various Industry Divisions of the War Production Board. These symbols replace the former S-3 designation which was used for B Products during the second quarter. The new symbols will not be applicable until the third and subsequent quarters.

The purpose of applying the new symbols to B Products is to provide the War Production Board with a means of determining at mill levels, the uses to which controlled materials will be put.

Each symbol indicates a B Product program. The following examples will demonstrate their use:

(1) Storage batteries, airline hydraulic motor brakes, automotive assemblies, carburetors other than those for aircraft, automotive repair shops except machinery and equipment, spark plugs, except for aircraft, all fall within the program designated B-4. This program is within the jurisdiction of the Automotive Division.

(2) Electric motors, dynamotors, motor-generator sets, mine locomotive motors, and others, fall within the G-6 B product program, under the General Industrial Equipment Division.

(3) Railway car accessories, trolley bus and motor bus accessories, railway and transit signal equipment and other related transportations are designated M-8, under the Transportation Equipment Division.

A special program designated S-4, is established to cover a miscellaneous group of B Products, including such items as loose-leaf binders, printing rolls, multigraph and printing presses, power coding machines, paper folding machines, wire stitching machines, and others. The plan for using the new B Products symbol calls for continued use of the S-1 symbol applying to repair parts. The new B Product designations completely replace the use of the former S-3 symbol.

This means that in applying a preference rating to industrial dust-collecting equipment, for example, the preference rating will be accompanied by the symbol J-5, which will give it an uprating similar to that formerly granted by the use of the symbol S-3.

Official B Product program identification symbols are listed as follows:

AUTOMOTIVE DIVISION

Symbol B-1

Auto accessories and replacement parts

Symbol B-2

Internal combustion engines (Automotive)

Symbol B-3

Sleeve bearings, journal bearings and bushings

Symbol B-4

Storage batteries (aircraft)
Brakes, automotive, air and hydraulic
Wheel assemblies, automotive
Carburetors (exc. aircraft)
Automotive repair shop special machinery and equipment
Spark plugs (except aircraft)
Storage batteries (except aircraft)

BUILDING MATERIALS DIVISION

Symbol B-5

Bolts, nuts, screws, rivets (exc. aluminum rivets) (aircraft)
Bolts, nuts, rivets (exc. aluminum), washers, screws, and pins

Symbol B-6

Service entrance switches and multi-breakers for housing and industrial lighting circuits
Electric conduit and conduit fittings
Electric connectors
Fuses, under 2300 volts
Wiring devices and supplies, electric

Symbol B-7

Infra-red heating and drying equipment
Lighting fixtures
Floodlights and searchlights
Fluorescent lighting fixtures (commercial and industrial), and cold cathode lighting systems
Incandescent lighting fixtures: Industrial, infra-red, mercury lamp (commercial and residential)
Marine lighting equipment and accessories
Special blackout and dimout lighting fixtures
Street and highway lighting fixtures and traffic control signals and controllers
Tools, edge
Tools, hand (exc. mechanics' hand service tools)
Building mesh, metal
Doors and windows, metal
Fabricated structural metal building products
Plastering bases and plastering accessories, metal
Screen cloth, insect (metal)
Sheet metal building products
Hardware, builders'
Hardware, transportation equipment
Hardware (exc. builders' and transportation equipment); saddle and luggage hardware, furniture and refrigerator hardware, mail receivers and boxes
Non-metallic mineral building products

CONSTRUCTION MACHINERY DIVISION

Symbol B-8

Power cranes and shovels, draglines, buckets, stiff-leg derricks, and dredges
Winches and hoists, contractors' elevating
Drilling and boring machinery, earth and rock (exc. well drilling)
Drilling machinery, water well

Symbol B-9

Construction equipment, tractor mounted
Track-laying tractors

Symbol G-1

Construction machinery, specialized
Construction material mixers, spreaders, pavers, surfacers, finishers, tampers, vibrators, and related construction machines
Construction material processing equipment
Scrapers, maintainers and graders

CONSUMERS DURABLE GOODS DIVISION

Symbol G-2

Clocks (aircraft)
Watches (aircraft)
Camera accessories (aircraft)
Plates, name (aircraft)
Bicycles
Power cycles (exc. motorcycles)
Lamp bulbs and tubes, electric
Cooking and heating appliances, commercial (electric)
Cooking and heating appliances, domestic (electric)
Electrical appliances, commercial (exc. heating and cooking)
Electrical appliances, domestic (exc. heating and cooking)
Dry cell batteries
Tubes, electronic (exc. radio and radar, rectifier, X-ray, and physiotherapy tubes)
Tubes, rectifier (tungar, rectigon, and similar tubes)
Lawn mowers, hand and power
Refrigerators, ice (domestic)
Flashlight cases and portable electric lanterns, incandescent
Lamps, liquid fuel
Lamps, portable electric (incandescent) (exc. industrial bench machine, and physiotherapy)
Lanterns, electric, incandescent (exc. portable electric lanterns)
Bedsprings
Bunks and berths, metal
Furniture, wooden
Hospital beds, metal
Photographic equipment and accessories
Food preparation and serving fixtures, equipment and appliances, commercial (exc. cooking)
Cutlery
Razors (exc. electric)
Razor blades
Jewelry
Silverware, plated
Silverware, sterling
Clocks and watches (including chronometers)
Animal traps and cages
Bells and gongs, non electric
Kitchen, household, and other miscellaneous articles as defined by W.P.B. Order L-30 (exc. military and naval types)
Identification plates, badges, emblems, pin-tickets, and tags (exc. military)
Hairpins, bob pins, and hair curlers
Needles, domestic
Pins, common and safety
Mirrors
Morticians' goods
Musical instruments
Office supplies (including marking devices)
Pens and pencils
Umbrellas and parasols
Baby carriages and similar equipment
Fishing equipment, commercial
Sporting goods (exc. mechanical rubber goods)
Church goods

CONTAINERS DIVISION

Symbol G-3

Cylinders, gas (aircraft)
Gas cylinders (exc. flasks and containers)

Symbol G-4

Drums and barrels, steel (50 gauge and heavier)
Plugs and flanges for steel shipping containers

Symbol G-5

Bags (aircraft)
Containers, paper-consumer type
Shipping containers, corrugated and solid fiberboard, using wire or staples but not strapping (exc. fiber drums)
Drums, fiber
Beverage crowns, metal
Crowns, metal (exc. beverage)
Collapsible tubes, including clips
Fluid milk shipping containers
Shipping kits and pails, steel
Bag tins, metal
Baskets and hampers, veneer
Boxes and crates, wooden—nailed
Boxes and drums, plywood
Boxes, wooden, wirebound
Cooperage, slack
Cooperage, tight
Strapping, metal (round and flat), including seals

GENERAL INDUSTRIAL EQUIPMENT

Symbol G-6

Motors, electric (aircraft)
Amplidynes, selsyns, and dynamotors
Motors and generators, including motor generator sets, except generators for internal combustion engines, motors made by electric appliance manufacturers for incorporation therein, and motors for elevators and mine locomotives

Symbol G-7

Compressors and dry-vacuum pumps, reciprocating
Pumps, industrial

Symbol G-8

Mechanical power transmission equipment, industrial (except speed changers)
Speed changers

Symbol G-9

Heat exchangers

Symbol J-1

Welding equipment and apparatus, electric
Welding equipment and apparatus, non-electric

Symbol J-2

Welding rods and electrodes

Symbol J-3

Electric motor controls and control equipment
Air circuit breakers (up to 600 amperes and 600 volts): AB type, ET type
Bus ways and bus ducts (up to 600 volts and 4,000 amperes)
Panel boards and distribution boards, electric (industrial)
Switches, knife and enclosed, rated 30 amperes and above

Symbol J-4

Refrigeration and air-conditioning equipment (exc. domestic refrigerators)

Symbol J-5

Switches and circuit breakers, electric (aircraft)
Conveyors and conveying systems (exc. underground mine conveyors)
Trucks and tractors, industrial (hand-operated)
Trucks and tractors, industrial (power-propelled)
Fans, blowers and exhausters (exc. turbo blowers, soot blowers and domestic propeller type fans) of a portable nature
Dust-collecting equipment, industrial
Turbo blowers and turbo exhausters
Elevators (exc. shipboard elevators, portable elevators to be reported as industrial trucks, mine hoists)
Spraying equipment, industrial
Presses, baling (exc. agricultural)
Lubricating equipment, industrial
Glue pots
Bakery machinery (exc. field baking equipment)
Canning plant machinery
Cereal manufacturing machinery
Dairy and milk products plant machinery
Sugar mill and refinery machinery, cane and beet
Fiber drum making machinery
Paper bag making machines
Paper can and tube making machines
Dry kilns and redriers
Logging and sawmill machinery and equipment
Wooden box making machinery
Woodworking machinery (exc. container making machinery)
Tobacco manufacturing machinery and equipment
Ceramic manufacturing machinery
Can making and can closing machines
Wire working machinery
Anodizing equipment
Electroplating equipment
Magnets, electrical lifting
Bottling machines
Case packers
Case sealing machines
Packaging machines
Wrapping machines
Pressure vessels
Chains, industrial power transmission
Metallic tubing and hose, flexible
Carbon brushes (including automotive)
Carbon products, industrial, molded or extruded from a petroleum coke, graphite or other carbon base (other than brushes), except graphite electrodes over 1" in diameter and graphite electrolytic anodes

HEALTH, SAFETY AND TECHNICAL SUPPLIES DIVISION

Symbol J-6

Fire extinguishers and fire extinguishing accessories (aircraft)
Kits, emergency (aircraft)
Litters (aircraft)
Fire apparatus, motorized and auxiliary
Optical and ophthalmic goods making machinery
Physiotherapy apparatus, electrical
X-ray apparatus and tubes
Safety equipment, industrial
Automatic sprinkler systems
Fire extinguisher systems, piped and generator sets
Fire extinguishers, portable; and stirrup pumps
Fire hose, hose dryers, racks, reels, and related products
Alarm and signal systems, protective
Engineering instruments and equipment (including surveyors, drawing and mathematical
Balances and weights (laboratory)
Analytical and industrial testing instruments and apparatus (laboratory)
Magnifiers, microscopes, and microtomes
Physical chemistry and chemical physics instruments and apparatus
Physics apparatus (for study of physics)
Blowers and vacuum pumps (laboratory)
Constant temperature apparatus and devices (laboratory)
Chemical laboratory apparatus
Surgical and medical instruments and equipment
Dental instruments, apparatus, and equipment
Dental supplies and appliances
Ophthalmic goods
Surgical and medical supplies and orthopedic appliances
Research laboratories (services)

MINING DIVISION

Symbol J-7

Crushing and grinding machinery, stationary (mine and smelter types)
Cars and locomotives, underground mine haulage
Coal cutting machines
Conveyors, portable underground mine type
Hoist, mine types
Ore dressing and coal preparation equipment (exc. crushers and grinders)
Mine loaders, underground
Smelting and refining equipment (exc. furnaces)
Mining equipment, specialized
Diamond core drills

PLUMBING AND HEATING DIVISION

Symbol J-8

Dishwashing and glasswashing machinery, commercial
Sanitary ware, plumbing
Plumbing fixtures, fittings and trim
Boilers, low-pressure, cast-iron
Boilers, low-pressure, steel
Coils, blast heating
Convectors, heating
Radiators, cast iron
Cooking stoves and ranges, domestic (exc. electric)
Cooking equipment, commercial (exc. electric)
Food preparation and serving equipment (steam connected)
Heating stoves, domestic (exc. electric)
Unit heaters and unit ventilators
Warm air distribution equipment, registers, stove and smoke pipe
Warm air furnaces
Burners, gas industrial
Burners, oil
Burners, combination oil and gas (industrial)
Gas conversion burners, domestic
Oil burners, domestic
Stokers, domestic
Heating system controls
Hot water equipment, domestic (exc. electric)

RADIO AND RADAR DIVISION

Symbol J-9

Capacitors, fixed, radio and radar
Coaxial cable, radio frequency
Condensers, radio and radar
Crystal assemblies, radio and radar
Filters, radio and radar
Microphones, radio and radar
Resistors, radio and radar
Sockets, radio and radar
Speakers, radio and radar
Test sets, standard, radio and radar
Vibrators, radio and radar
Tubes, radio and radar
Control valves and regulators, industrial type
Instruments, combat type (exc. fire control equipment, aircraft, and navigation instruments)
Instruments, industrial type (for plant facilities, etc.)
Radio hardware
Hardware and sprockets, radio and radar

SHIPBUILDING DIVISION

Symbol K-1

Valves, steel

Symbol K-2

Valves, except steel

Symbol K-3

Pipe fittings, steel
Pipe fittings, except steel

TOOLS DIVISION

Symbol K-4

Bearings, anti-friction (aircraft)
Bearings, ball and roller (except aircraft and main thrust bearings for ships)

Symbol K-5

Machine Tools, non-portable
Machine tools and metal-working machinery attachments and accessories

Symbol K-6

Tools, metal-cutting

Symbol K-7

Tools, small (aircraft)
Cranes, hoists and winches
Die casting and moulding machines, metal
Extruding machines, metal
Forging machines
Presses, hydraulic and mechanical (metal working)
Roll bending, plate bending, pipe bending and other structural shape bending machines
Shears, punches and nibblers (power-driven)
Foundry machinery, equipment and supplies
Heat treating equipment, metal
Metal-working machines and tools, portable
Furnaces, electric, metal-melting
Files and rasps
Tools, mechanics' hand service
Gauges and machinists' precision measuring tools
Chains, monel-metal
Chains (exc. anchor, power transmission, and monel metal chains)
Abrasive products, manufactured

TRANSPORTATION EQUIPMENT DIVISION

Symbol B-2

Internal combustion engines—locomotives

Symbol K-8

Railroad car accessories
Railroad locomotive accessories
Rapid transit and street railway car accessories
Trolley bus and motor bus accessories
Brake actuating mechanisms, air
Railroad and transit maintenance of way work equipment
Railroad and transit track equipment

Railroad and transit signal equipment
Repair shops, railroad transportation equipment

ALL OTHER WPB INDUSTRY DIVISION "B" PRODUCTS CHEMICAL DIVISION

Symbol S-4

Blast detonating equipment
Sewer cleaning equipment and machinery
Meat packing house machinery
Chemical producing machinery
Paint and varnish making machinery
Drug, pharmaceutical and cosmetics machinery
Plastic molding machinery
Fertilizer machinery and equipment
Salt processing machinery
Animal and fish oil machinery and equipment
Vegetable oil machinery and equipment
Cooking utensils, glass

CORK DIVISION

Symbol S-4

Asbestos building materials
Asbestos textiles
Fibrous glass products
Cork products

MISCELLANEOUS MINERALS DIVISION

Symbol S-4

Diamond dies
Brazing alloys
Ferro-cerium
Jewel bearings

PRINTING AND PUBLISHING DIVISION

Symbol S-4

Loose-leaf binders
Printing rollers
Presses, lithographic and printing
Power Cutting machines (printing)
Paper folding machines (printing)
Wire stitching machines (printing)
Paper drilling machines: Hand lever; foot power (printing)
Paper perforating machines (printing)
Blue printing developing and drying machines
Complete fonts of composing machine matrices (printing)
Composing machine molds (printing)
Remelt furnaces and molds (printing)

Symbol S-4

Complete fonts of foundry type (printing)
Casting boxes (printing)
Whirlers (printing) (plate coating machines)
Plate graining machines (printing)
Opaquing and line-up tables (printing)
Photo-engraving screens
Vacuum frames (printing)

PULP AND PAPER DIVISION

Symbol S-4

Envelopes and tablets, paper

SERVICE EQUIPMENT DIVISION

Symbol S-4

Vacuum cleaners, industrial
Office machinery
Scales and balances (exc. laboratory)
Laundry, dry cleaning and pressing machinery, commercial
Laundry machinery, domestic
Floor finishing and floor maintenance machines
Electric and elevator repair shops
Mechanical repair shops
Electroplaters, galvanizers and other metal coaters (services)

STEEL DIVISION

Symbol S-4

Nails (exc. steel wire nails)
Castings, iron, rough

TEXTILES, CLOTHING AND LEATHER DIVISION

Symbol S-4

Rope (aircraft)
Cotton ginning and delinting machinery
Sewing machines, industrial
Textile machinery
Leather working machinery
Broom, brush and mop making machinery
Bag filling and closing machines
Mattresses
Hooks and eyes, slide and snap fasteners, buckles, buttons, and miscellaneous apparel findings
Brushes: Fiber, steel, wire
Cut tacks

VARIOUS

Symbol S-4

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Priority, Allocation and Limitation Orders

Issued by the War Production Board,
New Social Security Building, Washington, D. C.,
Telephone Republic 7500.

CMP Regulations

No. 1, issued Jan. 12, 1943; last amended Feb. 27, 1943. Defines rights and operations of industry under Controlled Materials Plan. Provides manufacturers with an operating guide. Small order defined as one for Class A products requiring total amounts of controlled materials not exceeding: 1 ton, carbon steel; 400 lb. alloy steel; 100 lb., copper or its alloys; and 20 lb., aluminum. Prohibits breaking up of large orders in order to qualify under the small order procedure, and makes these figures monthly maximums which may be used to fill small orders.

No. 2, issued Jan. 9, 1943, Restricts consumers' inventories of aluminum, copper and steel to minimum practicable working inventory and to a maximum of 60 days' forward needs. Exempts producers who are subject to Utilities Order U-1 or Preference Rating Order P-56; operators in petroleum industry who are subject to Preference Rating Order P-98-c; can manufacturers in Washington, Oregon, California, and Utah.

No. 3, issued Feb. 9, 1943; last amended Feb. 27, 1943. Sets up operating procedures under Controlled Materials Plan. Defines place of preference ratings under CMP. Permits dealers, distributors and jobbers to use allotment number or symbol on orders received in extending the rating.

No. 4, issued Feb. 6, 1943. Governs sales of controlled materials by warehouses and distributors, effective Feb. 15 in the case of copper and March 31 for aluminum and steel.

No. 5, issued Feb. 9, 1943; last amended April 8, 1943. Provides methods for obtaining maintenance, repair and operating supplies. Excludes specified materials.

No. 5A, issued March 19, 1943; last amended April 8, 1943. Provides governmental agencies and private institutions with procedures for obtaining maintenance, repair and operating supplies. Assigns allotment symbol, MRO-5A, and ratings of AA-1, AA-2X and A-10 for specified purposes. Excludes specified materials.

No. 7, issued March 2, 1943. Provides single standard form of certification to validate any delivery order under CMP.

No. 8, Production Requirements of Controlled Materials Producers, effective March 13, 1943. Provides rating of AA-1 and an allotment symbol, X-1, which may be applied to purchase orders for other than controlled materials by those controlled materials producers who apply for and receive specific authorization to operate under the regulation's terms. Applications for controlled materials or Class A products to be incorporated by a producer in a controlled materials item are to be made on Form CMP-4B addressed to the Controlled Materials Division. In the case of aluminum required for certain listed purposes, form CMP-13 is to be used in making the application which should be addressed to the Aluminum and Magnesium Division. When controlled material required is made of the same basic metal as that produced by the applicant, requirements will be filled only by directives issued according to terms of CMP Regulation No. 1. Prohibits any consumer of controlled materials from including in any bill of materials or application for allotment requirements for controlled materials needed for manufacture of the controlled material to be included in his product.

"E" Orders

E-1-b: Machine Tools, May 1, 1942; last amended March 8, 1943, effective May 1, 1943. Supersedes E-1-a which in turn superseded E-10. Apportions deliveries 75% to Service purchases, 25% to foreign buyers and essential domestic and Canadian industries. Delivery schedules of orders from each of seven service groups determined by ratio of each group's backlog of orders to total backlog for all service groups. Other orders must be accompanied by certified or photostatic copy of preference rating certificate PD-1A, PD-3, PD-3A, PD-4, PD-408, PD-311; or rating order P-19-h. Existing schedules frozen until May 1. Producers file PD-669, PD-670, PD-671 and WPB-417 or WPB-1440.

E-1-c: Machine Tools, effective June 16, 1942, assigns A-1-a rating to orders of certain Canadian buyers. Amendment, Aug. 18, 1942, provides for re-allocation of tools after certain quotas have been filled.

E-2-b: Cutting Tools, effective Aug. 31, 1942, supplanting E-2 and E-2a; last amended Dec. 12, 1942. Requires A-9 or higher rating for sale or delivery of any of 32 types of listed tools. Orders for special tools, placed before Aug. 31, 1942, need A-10 rating for completion. Tools, other than high speed or alloy-tipped, require A-10 or higher rating. Order specifies production and scheduling procedure for tool producers. Permits delivery of "producers' minimum practicable manufacturing quantity".

E-3: Machine Tools, allocation for United Kingdom, effective Jan. 12, 1941, expired July 1, 1942.

E-4: Second Hand Machine Tools, effective Feb. 3, 1942. Authorizes WPB to prohibit sale or other disposal of any second hand machine tool and to determine allocations.

E-5: Gages, Precision Measuring Tools, Testing Instruments, Chucks, effective June 15, 1942. Revoked E-1-a revised. Sales and deliveries restricted to orders with A-10 or higher rating.

E-5-a: Gages, Precision Measuring Tools, Testing Instruments, Chucks, March 26, 1943. Permits sales and deliveries to approved users and distributors only on A-9 or higher orders. Restricts purchasers' inventories of instruments, except specified production gages, to 30-day supply. Assigns to individual workers same preference rating as that assigned by CMP regulations to their employers for MRO supplies.

E-6: Hand Service Tools, June 12, 1942, last amended Oct. 29, 1942. Restricts sales by producers to orders rated A-9 or higher. Limits alloy steel use in making hand tools to NE 1300, 1800, 9200, 9400 and 9600 series. Other grades received by a producer prior to Nov. 1, 1942 may be used.

E-7: Metal Cutting Saw Blades, effective Aug. 31, 1942, last amended Oct. 6, 1942. Limits sales of band and hack saw blades to orders rated A-9 or higher. Excepted are hand-frame hack saw blades containing no alloying elements in excess of 1.25% tungsten and 0.75% molybdenum; no thicker than 0.025-inch or longer than 12 inches.

E-9: Precision Measuring Instruments and Testing Machines, effective March 10, 1943. Restricts sales and purchases to A-1-a or better rated orders on prescribed forms. Permits sale and delivery of repair parts. Permits filing of schedules. Supersedes provisions of E-1-b and E-5.

E-10: Anti-friction Bearings, effective April 13, 1943. Requires producers to schedule production, commencing June 1, for successive 90-day periods. Quarterly output and deliveries must be scheduled as follows: 85% for "production orders" and 15% for miscellaneous orders, subject to minor variations. Requires preference ratings on all orders except for automotive replacement parts and farm machinery and equipment. Purchasers' inventories limited to 60-day supply or minimum practicable working inventory.

E-11: Foundry Equipment and Electrical Metal Melting Furnaces, effective April 23, 1943. Prohibits sales, transfers or deliveries of specified types of equipment after June 1 except on orders bearing rating of AA-4 or higher. Prohibits purchase by the application of any preference rating on forms PD-25A, PD-25F or CMP Regulation 5 or 5A. Exempts repair and maintenance of such equipment.

"L" Orders

L-1-e: Motor Trucks and Trailers, effective March 13, 1943, superseding L-1-a and L-1. Provides for production of 500 "Off-the-Highway" trucks. Orders have AA-2X rating. **L-1-g,** effective July 1; last amended Jan. 6, 1943. Restricts production to specific WPB schedules. Permits manufacture of 800 semi-trailer petroleum tanks to be allocated under M-100.

L-1-h, effective Jan. 7, 1943; last amended March 31, 1943. Permits scheduling of protection without regard to orders rated lower than AA-4. Bans protection except as specifically authorized by WPB. Producers file PD-571 on first of each month.

L-2-g: Passenger Automobiles, effective Jan. 21, 1942. Production banned. **L-2-i,** March 9,

1942, prohibits automotive companies from selling alloy steel except on orders of A-1-k or higher rating; all other steel on A-3 or higher rating. Sales must be certified to Distressed Stocks Unit Iron & Steel Branch, WPB.

L-3-f: Light Motor Trucks, effective Jan. 21, 1942. Production for any purpose banned.

L-5-d, Mechanical Refrigerators, issued Sept. 5; last amended March 27, 1943. Provides for distribution of "frozen" stocks.

L-7-c: Domestic Ice Refrigerators, effective Nov. 14, 1942; last amended March 29, 1943. Revokes L-7, L-7-a, L-7-b. Limits production to quotas assigned to manufacturers plus units to fill AA-5 or higher orders. Prohibits production of any ice refrigerator containing any rubber or any metal other than iron and steel, except metal used in galvanizing, plating or coating steel; or having an iron and steel content of more than 6 lb. or having net ice capacity of other than within 10 per cent of 50 to 75 lb.

L-11: Chlorine, effective Nov. 15, 1941. Restricts use in manufacture of pulp and paper board.

L-13, L-13-a: Metal Office Furniture, Equipment, effective Aug. 8, 1942. Supplementing L-13. Halts work on all orders except as authorized by WPB.

L-18-b: Domestic Vacuum Cleaners, effective Nov. 26, 1942. Supersedes L-18 and L-18-a. Prohibits production of all domestic types, regardless of ultimate use. Bans output of attachments.

L-20: Cellophane and similar Transparent Materials derived from cellulose effective Nov. 8, 1941, last amended Jan. 4, 1943. Bans use of material over .003-inch thick for packaging, sealing or manufacture of specified products.

L-21: Automatic Phonographs, Weighing, Amusement and Gaming Machines, effective Dec. 10, 1941. Prohibits use of aluminum in production. **L-21-a,** March 16, 1942 prohibits production of machines and spare parts for slot machines. Material stocks may be used to fill orders rated higher than A-2.

L-22-a: Warm Air Furnaces, effective Dec. 14, 1942. Bans production of steel furnaces except as authorized on PD-704 for urgent military purposes. Restricts use of iron and steel to make replacement parts.

L-23-c: Stoves, Ranges, other Domestic Cooking Appliances, effective Dec. 2, 1942. Prohibits production by manufacturers with factory sales $2,000,000 or more in year ended June 30, 1941 and by smaller makers in specified labor shortage areas. Small makers not in labor shortage areas permitted to make only "permitted types" and limited in iron, steel use in manufacturing stoves and ranges to 70% of base period average. Bans attachment of thermostats to cooking stoves.

L-23-b, May 2, 1942, last amended March 6, 1943. Forbids disposal of electric ranges except on authorization on PD-556 and to ultimate user upon certification of necessity. Prohibits production after March 6, 1943. Bans use of copper in manufacture of parts except to conduct electricity.

L-27: Vending Machines, effective Dec. 31, 1941. **L-27-a,** March 17, 1942, prohibits production and limits production of spare parts to rate in year ended June 30, 1941.

L-28: Incandescent & Fluorescent Lamps, effective Jan. 24, last amended Oct. 24, 1942. Bans production of Christmas tree, advertising and decorative incandescent lamps. Quarterly production of incandescent and fluorescent lamp bases limited to 125% of 1940 rate on metal weight basis. Delivery of bases must be authorized by WPB on PD-532 previously filed by manufacturer by 20th of month. Plated iron and steel must be substituted for certain copper, brass, nickel and chromium parts. Brass bases for lamps for military purposes exempted. Use of nickel-clad wire for lamp leads permitted. Production of blackout lamps permitted only for military orders. **L-28-a,** effective Nov. 1, 1942, orders simplification and standardization in manufacture of electric light bulbs and lamps. Restricts production of lamp parts.

L-29: Metal Signs, March 25, 1942. Bans use of all metals. Exempts signs containing less than 5% of metals by weight and railroad and highway signs.

L-30: Household Utensils, effective March 31; last amended Aug. 24; revoked Nov. 17, 1942. **L-30-a** effective Nov. 12, 1942, last amended March 22, 1943. Restricts production of galvanized ware and non-metal coated metal articles. Manufacturers file PD-655 on 10th of each month.
L-30-b: effective Oct. 24, 1942, restricts production of enameled ware, except for completion of articles from materials already blanked out and articles for military use.
L-30-c: effective Oct. 23, 1942. Limits production of cast iron ware to specified articles and establishes quota for each item based on percentage of iron used during year ended June 30, 1941.
L-30-d: effective Nov. 23, 1942; last amended March 26, 1943. Prohibits use of metal in production of kitchen gadgets, cooking utensils and housewares, except as specifically provided in the order or in other orders of the L-30 series.

L-31: Natural Gas, effective Feb. 16, 1942; last amended Jan. 1, 1943. Bans gas use for structures unless heating equipment installed or specified in construction contract and main foundation completed by specified dates. Installation of gas equipment prohibited after Nov. 30 if delivery of gas for such equipment is not permitted. WPB may ban delivery of gas if consumer fails to obtain adequate supply of fuel if available to operate auxiliary equipment; or if consumer fails to convert equipment under certain conditions.

L-32: Metallic License Plates, effective March 18, 1942. Prohibits state and local governments from issuing plates in one year in quantity more than 10% of weight of plates issued in corresponding year ending between June 30, 1941 and July 1, 1942, and then only to replace destroyed or lost plates, for new licenses or for "date tabs" not more than 4 square inches in size.

L-33: Portable Electric Lamps, Shades, effective March 23, 1942; last amended Dec. 10, 1942. Prohibits production of lamps and shades containing critical materials. Lamps and shades may be made for Army, Navy, Maritime commission but ban on metal applies.

L-36: Umbrella Frames, Nov. 12, 1942. Limits output to 30% of 1941 total. Restricts use of steel in women's umbrellas (exclusive of tips and handles) to four lb. per dozen frames, if they have non-metallic tips and ferrules; 4.33 lb. if they have steel tips and ferrules; ribs limited to 10 of max. 20 in. length; men's umbrellas, to 5 lb. of steel per dozen frames; ribs to 8 of max. 25 in. length. Use of iron and steel for repair parts limited to 5% of total consumed by any manufacturer for frames under provisions of the order.

L-37: Musical Instruments, effective Feb. 17, 1942. **L-37-a,** May 29, prohibits processing critical materials. Permits production of instruments containing not over 10% of critical materials at rate of 75% of critical material use in 1940. Repair parts output cut to 75% of 1940 rate.

L-38: Air Conditioning, Commercial Refrigeration, effective May 15, 1942; last amended April 14, 1943, effective April 6, 1943. Restricts delivery of parts (1) to emergency repair service and to fill AA-4 or higher orders; (2) to fill authorized purchase order; (3) to orders for direct use by armed services; or (4) to orders accepted prior to April 6 on A-1-c or higher rating. All replaced metal parts must be delivered to dealer or producer, if required, or to scrap dealer within 30 days. Apply for authorization to purchase industrial refrigeration or air conditioning on PD-830; for small commercial refrigeration equipment on PD-831. Lists equipment that may or may not be produced, or may be delivered to specific users; purposes for which equipment may be manufactured; categories of users of "comfort cooling systems" to whom repair parts cannot be delivered except under certain conditions.

L-39: Fire Protective, Signal and Alarm Equipment, effective Feb. 24, 1942; last amended Jan. 20, 1943. Restricts production of fire extinguishers, sprinkler systems, fire hydrants and fittings, hose racks and dryers, lightning rods, signal and alarm equipment. Specifies products for which strategic materials may be used. Permits manufacture of stirrup pumps containing no critical materials and conforming to certain specifications.

L-41: Construction, effective April 9, 1942, last amended Feb. 19, 1943. Prohibits construction unless specifically authorized by WPB or unless estimated cost of the project is limited to $200 for residential and specifically stated types; $1,000 for multiple residential; $1,000 for agricultural; $5,000 for industrial; and $1,000 for "other restricted" construction not otherwise classified. When prioritites assistance not required, application for authority to begin construction made on PD-200; project amendment on PD-200B. Certain reconstruction may be started without authorization. Authorization to complete the job is required. **L-41-a,** May 23, 1942, stops work of $5000 or more on public amusement projects, except playgrounds and temporary structures. **L-41-b,** Aug. 10, last amended Oct. 2, 1942. Extends to entire country limited exceptions granted to convert heating equipment to permit use of fuel other than oil, gas, electricity. Permits certain types of insulation work using non-metallic materials without specific authorization, if begun prior to Jan. 1, 1943. Manufacturers under PRP should file with Plumbing and Heating Branch PD 25F, others PD-1A for iron and steel for furnace grates. **L-41-c,** Dec. 22, 1942, removes operational construction by any logger from provisions of L-41.

L-42: Plumbing and Heating Products, effective Feb. 11, 1942; last amended April 17, 1943. Simplifies various items manufactured by plumbing and heating industry.

Schedule I revoked Jan. 23, 1943.

Schedule II. revoked April 17, 1943.

Schedule III, issued March 7, 1942, eliminates metal jackets, fusible plugs and petcocks from low pressure heating boilers. Bans production of metal jackets.

Schedule IV, effective April 1, 1942, directs discontinuance of manufacture of medium soil pipe; elimination of use of brass pipe plugs and brass-trap screws with soil pipe fittings; limitation of production between "standard" and "medium".

Schedule V, effective April 1, 1942, lists specific plumbing fixtures which may be made of copper, copper-base alloy or die-cast zinc. Schedule V-a, effective June 15, 1942, last amended Jan. 23, 1943, prohibits use of copper or its alloys in making various domestic plumbing fixtures.

Schedule VI, April 16, 1942, establishes types and sizes for tubular radiators, eliminating production of larger units.

Schedule VII, revoked Dec. 19, 1942.

Schedule VIII establishes specifications for low pressure thermostatic radiator traps, float and thermostatic traps, boiler return traps, strainer and supply valves, effective June 15.

Schedule IX, revoked Dec. 19, 1942.

Schedule X, June 16, prohibits production of electric sump pumps and cellar drainers except in accordance with stated specifications.

Schedule XII, June 20, bans manufacture of various bath and wash room items other than those conforming to defined specifications covering metal use. Producers must file PD-727 monthly.

L-43: Motorized Fire Apparatus, effective Feb. 27, 1942, last amended April 16, 1943. Eliminates use of fire bells which contain any metal other than steel. Aluminum, copper, nickel, chromium, cadmium, tin, zinc, steel, synthetic rubber, except for limited use in specific list of products. Manufacturers of motorized apparatus must file monthly production and shipping schedules on PD-774. Restricts production and sale of specified types.

L-44: Radio Receivers, Phonographs, effective Jan. 23, 1942. **L-44-a,** March 7, 1942, prohibits production after April 22, 1942. Use of more than $500 worth of materials, other than wooden cabinets, ordered after Feb. 11, 1942, banned. Replacement parts not affected.

L-46: Electric Power, effective Feb. 27, 1942. Provides for integration of generating systems by utilities and industries and curtailment of consumption in Niagara frontier area in event of power shortage.

L-48: Light Aircraft, effective Feb. 17, 1942. Sales, other than to government agencies and Allied nations, prohibited, unless approved by WPB. Manufacture limited to planes with airframe content of 12% aluminum, regardless of rib material.

L-49: Beds, Springs, Mattresses, effective March 20, 1942, last amended Feb. 23, 1943. Prohibits use of iron and steel in production of mattresses and of lounges. Establishes quotas for production of and sets limits on use of iron and steel in bed springs. Sets

up regulations governing renovation of mattresses, springs, lounges and other products. Exempts manufacturers of bedspring parts.

L-50: Telephone Industry, effective March 2, 1942; revoked March 25, 1943.

L-52: Bicycles and Parts, effective March 12, amended July 16, 1942. Bans production of juvenile models. No models may weigh more than 31 pounds. Metals used in manufacture limited generally to iron, unalloyed steel, silver and gold. **L-52-a:** effective April 2, 1942, amended Sept. 2, 1942. Prohibits sales of new adult bicycles except as rationed. Limits output to 10,000 victory models a month, of which Westfield Mfg. Co. may produce 6000 and Huffman Mfg., 4000.

L-53: Track-laying Tractors, effective Feb. 19, 1942. Includes bulldozers, power control units, winches, etc. Prohibits producers and distributors from selling unused tractors or equipment, except as specifically authorized. **L-53-a,** April 9, 1942; last amended June 15, 1942. Bans production of 17-35 horsepower tractors; prohibits sale, lease or delivery except on specific release. **L-53-b** restricts deliveries to not more than 40% to military agencies; not less than 20% to war projects; not less than 20% to essential civilian operations; not less than 15% to export; 5% for miscellaneous purposes. Percentages based on number of units of each critical repair part produced each month.

L-54, L-54-a: Typewriters, effective March 17, 1942; last amended March 12, 1943. Prohibits manufacture except by Woodstock Typewriter Co. which may produce not more than 1600 per month. All new typewriters are reserved for the Army, Navy and Maritime Commission. Sets quotas of parts for export on same percentage basis as for production of new typewriters.

L-54-c: Office Machinery, June 1, 1942, last amended Jan. 15, 1943, revoking L-54-b. Restricts production to permit stockpile accumulation to accommodate needs of essential users until June 30, 1944. Production quotas fixed for each type machine. Also regulates distribution.

L-55: Shotguns, effective Feb. 23, 1942. Limits shotgun production in other than 12-gauge size to one-half average 1940 rate. Prohibits use of machinery suitable for making 12-gauge guns in turning out shotguns of other sizes.

L-56: Fuel Oil, effective March 14, 1942, last amended Feb. 5, 1943. Restricts uses and prohibits deliveries except in accordance with OPA rationing regulation.

L-57: Gas Masks and Anti-Gas Devices, effective March 3, 1942. Prohibits manufacture or sale, unless ordered by government agency and built to Army specifications.

L-58: Sextants, effective March 11, 1942. Prohibits sales except to government agencies, dealers or those with Coast Guard certificate. Imports from Great Britain prohibited unless approved by Lend-Lease Administration.

L-59: Metal Plastering Bases, effective March 23, amended July 11, 1942; **L-59-b:** Prohibits manufacture except: for government agencies; for use in connection with insulation blankets and pipe covering; rib type metal lath. Permits sale of bases in inventory prior to April 2, 1943.

L-60: Pistols, Rifles, Shotguns, effective Feb. 27, 1942. Prohibits disposition of new guns, except sales to federal, state, local and Allied governments and for Lend-Lease. Certain types released May 26.

L-61: Rubber Machinery, effective March 11, 1942, last amended Jan. 18, 1943. Restricts production, sale and delivery of equipment used to retread or recap tires to orders rated A-9 or higher on PD-1A, PD-1X, PD-200 or PD-408 certificates. Excludes from control tube-repair or spot equipment valued at $100 or less, and tire spreaders valued at $25 or less.

L-62: Metal Household Furniture, effective March 20, 1942; last amended May 14, 1942. Bans production of items with more than 5% metal content by weight (other than joining hardware).

L-63: Suppliers' Inventories, effective April 6, 1942, revoking M-67. Subsequently amended and reissued Aug. 13, 1942. Covers wholesalers, distributors, jobbers, dealers and retailers, furnishing automotive, aviation, builders' construction, dairy, electrical, farm, foundry, grain elevator, hardware, industrial, plumbing and heating, refrigeration, restaurant, textile mill, transmission or welding & cutting supplies from stock. Limits inventories in eastern and central time zones to twice sales from stock in second preceding month or to two-thirds sales in preceding three months; in other zones to three times sales in second preceding month or to total sales in preceding three months. Suppliers must record inventories and sales on PD-336 for WPB inspection. Seasonal lines may be stocked at previous year's rate. Exempted are suppliers with total inventory of less than $20,000 or with stocks of each type of supplies of less than $10,000. "Supplies" do not mean steel warehouse products, materials made of aluminum, auto and truck replacement parts, functional replacement parts for machinery and equipment, machinery or equipment costing more than $500 per unit, material rationed by OPA, non-critical building materials.

L-64: Burial Equipment, March 28, amended Sept. 24, 1942. Limits use of iron and steel in joining hardware to 4 lb. per casket; bans use of iron and steel in handle hardware, except fabricated assemblies in inventory prior to Sept. 24, 1942. Restricts amount of iron and steel in each liner to 50 lb., not exceeding 26 standard gage thickness, except thicker material in inventory prior to March 28, 1942. Permits use of lead in liners for gaskets and for soldering. Limits use of iron or steel in joining hardware for shipping cases or burial vaults to 2 lb. per unit and for handle hardware to 3½ lb. per unit for shipping cases. Bronze or other metallic finishing materials in inventory on March 28, 1942, may be used.

L-64-a: effective Oct. 2, 1942. Bans sale by manufacturers of caskets of specified measurement, containing more than 25 per cent of iron and steel, except for authorized uses.

L-65: Domestic Electrical Appliances, March 30, 1942. Production limited to orders rated A-2 or better. Nickel not permitted for plating. Making of replacement parts not restricted. Use of electrical resistance material limited to parts in stock and to 15% of 1941. consumption.

L-67: Lawn Mowers, effective March 30, 1942, last amended June 30, 1942. Bans production except gang mower production for Army, Navy, Maritime Commission and Lend-Lease at April 1-June 30, 1941, rate.

L-68: Garment Closures, Associated Items, effective April 1, 1942. Limits use of steel, zinc or zinc alloy in making slide fasteners or parts to 50% of rate for year ended June 30, 1941. Bans use of copper or copper alloy and restricts length of slide fasteners to 10 inches, except for trousers (may be 12 inches) and work jackets (may be 20 inches). Prohibits manufacture or delivery of slide fasteners made of steel, zinc, copper or their alloys for use on any of 32 specified articles. Bans copper use in making **hooks, eyes, snap fasteners,** buttons and other closures. Restricts use of steel and zinc to filling government orders.

L-69: Bright Work on Vehicles, effective March 14, 1942. Prohibits use of bright work on all types of motor vehicles and trailers, including replacement parts and accessories other than ventilator window latches, external locks, cylinder caps and covers, windshield wipers and body trim screws.

L-71: Flashlights, effective April 1, last amended Jan. 9, 1943. Bans use of aluminum, crude rubber, chromium, cadmium, nickel, tin, copper or copper base alloy, zinc, iron or steel in making dry cell batteries or cases with certain exceptions. Cuts production and places deliveries under strict control.

L-71-a, effective April 1, 1943, standardizes construction of hearing aid batteries and permits interchangeability of batteries for vacuum tube type instruments. Until May 31, 1943, 30-volt batteries may be produced with terminals not otherwise permitted by the order.

L-72: Razors and Blades, effective March 23, 1942; last amended Nov. 3, 1942. Safety razor production banned except for armed forces, export Lend-Lease. Copper consumption in making safety razors restricted to plating only, not over .0004-inch thick. Prohibits straight razor output. Razor blade production for civilians limited quarterly to the greater of these amounts: 21% 1940 output; 15½% 1941 output. Use of low carbon steel backing in single-edged blade limited to 0.018 inch thickness. Blade sales limited up to 18% for military services. Lend-Lease and export: up to 84% for civilians. Manufacturers must file PD-635 by 10th of each month.

L-73: Metal Office Supplies, March 28, 1942; last amended Dec. 26, 1942. Except for wire staples, iron and steel use cut 20% to 50% from rate in 1940. Use of any copper, tin, nickel, chromium, cadmium or crude rubber prohibited unless processing started. Zinc use limited to galvanizing necessary for practicable use. Manufacturers must follow federal specifications issued by Director of Procurement. Bans production of certain supplies. Prohibits production of repair parts for supplies, except staplers and perforators.

L-74: Oil Burners, effective April 15, 1942, last amended June 4, 1942. Production of burners capable of using more than 15 gallons of oil per hour limited to orders rated A-10 or better. Bans output of smaller burners. Excepts burners used on shipboard, or for cooking or heat treating, sold on orders rated A-10 or higher.

L-75: Coal Stokers, effective April 15, 1942, last amended Oct. 20, 1942. Restricts sales of stokers capable of feeding more than 60 pounds of coal per hour unless authorized by PD-668. Output of smaller stokers banned. Replacement parts may be made. Manufacturers must file production and delivery schedules with WPB.

L-77: Metal Windows, effective March 25, 1942; last amended March 19, 1943. Restricts production of metal window framework to orders with rating AA-3 or higher or for specified government agencies. Permits manufacture without rating of metal storm windows from material partially fabricated on April 8, 1943.

L-78: Fluorescent Lighting Fixtures, effective April 2, last amended Jan. 26, 1943. Prohibits manufacture or assembly of fixtures or parts except from material acquired on PD-25A or A-1-j preference rating and in maker's possession April 20, 1942 through orders placed before April 3. Restricts use of metals in manufacture of reflectors.

L-79: Plumbing, Heating Equipment, April 16, last amended Dec. 16, 1942. Permits delivery of equipment on A-10 or better rating; items costing no more than $5 if part of an order totaling no more than $10; oil burning furnaces replacing other similar equipment and installed for the purpose of reducing fuel oil consumption; hospital, surgical, dental, veterinarian, barbershop or beauty shop equipment; equipment authorized on PD-423. Shipments must conform with ration orders issued by OPA.

L-80: Outboard Motors, March 27, 1942. Halts production except for specified government agencies. Spare parts output limited to 75% of 1941 rate. Manufacturers' stocks of motors of 6 horsepower and more frozen for disposal to government.

L-81: Toys and Games, effective April 1, 1942; last amended Nov. 24, 1942. Prohibits manufacture or assembly of toys, games (including parts) containing cork, silk, urea plastics, antimony phenolic plastics, tin, zinc, rubber, silver, iron and steel. Use of joining hardware is limited to average 1941 use.

L-83: Industrial Machinery, effective May 15, 1942; last amended March 12, 1943. Prohibits filling orders for certain types of new or used machinery, except for specified government agencies, United Nations, Lend-Lease or on A-9 or higher rating from PD-1A, P-19-b, PD-25A or PD-408 certificates or on PD-3A certificate countersigned before May 18, 1942. Exempts certain orders involving less than $200 and parts worth less than $1000. Parts costing more than $1000 not restricted in event of actual breakdown of machinery.

L-84: Electric Heating Pads, effective April 4, 1942; last amended April 15, 1942. Bans all production.

L-86: Liquified Petroleum Gas Equipment, effective April 8, 1942. Prohibits installations with following exceptions: Material for maintenance or repair of existing equipment; installations in use prior to April 1, 1942, and subsequently withdrawn from use; containers exchanged in normal course of distribution; installations authorized by WPB.

Application for such authority made on PD-397.

L-88: Used Rails and Joints, effective April 22, 1942; last amended May 18, 1942. Prohibits disposition of used rails (35 to 132 lbs.) unless authorized by WPB. New rails may be received only to extent of used rail footage made available for use as ordered by the Director in following amounts: 15% within 30 days of new replacement rail receipt; 15% additional in 60 days; 20% additional in 90 days; 40% in 150 days. Permits disposal without authorization of not over 10 tons of rails monthly.

L-89: Elevators, effective July 9, 1942; last amended Jan. 27, 1943. Requires WPB authorization for manufacturers to fill orders for all elevators, except mine hoists and portable elevators. Restricted orders for revised control or other parts and accessories must be authorized by WPB except for repairs under $500 or for actual breakdown. Exempts orders for $25 or less and orders for equipment to be used on certain ships. Authorization applied for by purchasers on PD-411.

L-91: Laundry Equipment (commercial), effective April 18, 1942; last amended Dec. 14, 1942. Bans manufacture of commercial laundry and dry cleaning equipment without specific WPB authorization, except for Army or Navy. Deliveries must be authorized on PD-418. Bans use of monel, nickel, nickel silver, and nickel-chrome steels in production of new machinery, unless specified by certain governmental agencies. Manufacturers and distributors must file report by 7th of each month on PD-419.

L-92: Fishing Tackle, effective April 23, 1942, last amended Nov. 18, 1942. Prohibits use of metals, plastics and cork in making non-commercial tackle, except fish hooks, which may be made quarterly at 12½% of 1941 total. Prohibits use for repairing such tackle or for production of repair parts, except parts fully fabricated or in process on Nov. 18, 1942.

L-93: Golf Clubs, effective April 9, 1942, last amended Oct. 12, 1942. Prohibits use of iron, steel, other critical metals, plastics and cork in making golf clubs. Use of critical materials prohibited for manufacture of repair and replacement parts, except completely fabricated parts in manufacturers' stocks on Oct. 12, 1942.

L-97: Railroad Locomotives, effective April 4, 1942; last amended Jan. 1, 1943. Freezes finished units in producers' hands and prohibits production except in accordance with schedules issued by WPB. **L-97-a,** April 4, applies same regulations to railroad cars. **L-97-a-1,** April 24, 1942, cancels all A-2 or lower ratings assigned prior to April 29, (including those on material for freight car construction). Builders may sell any material to other builders or to railroads. **L-97-b,** Aug. 8, 1942, requires WPB authorization for production or delivery of railroad-type industrial cars.

L-98: Domestic Sewing Machines, effective April 25, 1942; last amended Jan. 2, 1943. Bans production of new machines. Limits use of iron and steel for needles in 1943 to 75% of 1940-1941 total; for other parts to 62½%. Restricts use of copper and copper-base alloy to conducting electricity and to 50% of the 1940-1941 total. Bans use of other nonferrous metals.

L-100: Compressors, effective April 17, 1942. All new, used and reconditioned heavy compressors placed under allocation. Manufacturers prohibited from accepting orders unless authorized on PD-420. PD-415 is application for authority to place order. PD-416 application for permission to make delivery

L-101: Passenger Carriers, effective May 21, 1942. Prohibits production or delivery of new trolley cars and commercial motor buses except on WPB instructions.

L-102: Used Generators and Steam Boilers, effective April 11, 1942. Prohibits sale, lease or option of used electric generating equipment or used steam boilers without WPB authorization, unless value is less than $1000.

L-103: Glass Containers, effective May 11, 1942; last amended Jan. 15, 1943. Prohibits manufacture not conforming to specified standards. Permits use of non-standard containers for paint until April 1.

L-104: Metal Hairpins and Bob Pins, effective April 25, 1942. They may be sold only in packages containing less than 100 pins. Length restricted to two inches or smaller. Amendment, Sept. 25, permits production at 25% of 1941 rate. Inventory of raw materials restricted to 30-day requirements.

L-105: Helmets, effective April 29, 1942. Limits production and sale of helmets for civilian use, except on government or United Nation orders.

L-106: Copper Use in Motor Vehicles, effective May 5, 1942; last amended March 10, 1943. Prohibits use of copper or copper alloys in making all but 15 specified operating parts. Exempts parts made for Army and Navy if specified in prime contract.

L-107: Extended-Surface Heating Equipment, effective June 15, 1942. Includes unit heaters, unit ventilators, blast heating coils, convectors and winter air conditioners. Prohibits delivery, except to Army, Navy, Maritime Commission or Coast Guard, unless authorized on PD-412A by WPB. Suppliers file PD-467 by 15th each month to report preceding month's deliveries.

L-108: Finishes of Metalworking Equipment, effective April 27, 1942. Finishes limited to one coat of primer or sealer; no filler; two coats of paint, enamel or lacquer of "old machine-tool gray."

L-110: Electroplating and Anodizing Equipment, effective May 11, 1942. Limits sales to A-1-j or higher ratings.

L-111: Hand Trucks, effective May 7, 1942; last amended April 13, 1943. Restricts manufacture and sale of material-handling equipment.

L-112: Industrial Power Trucks, effective July 10, 1942. Prohibits manufacturers from accepting orders unless rated A-9 or higher on PD-1A or PD-3A certificate. Production limited to "approved standard models". Limits use of specified critical materials.

L-114: Safety Equipment, effective May 5, 1942; last amended Feb. 15, 1943. Use of scarce material banned, except on orders rated A-2 or higher if made from parts manufactured prior to May 5, or for certain specified parts, or for delivery to Army, Navy, Maritime Commission under specified conditions. Bans use of copper and copper-base alloys in certain types of equipment.

L-117: Heavy Power & Steam Equipment, effective May 18, 1942; last amended Nov. 4, 1942. Limits sales and deliveries to government and Lend-Lease orders rated A-9 or higher assigned by PD-3A countersigned prior to May 18, or by PD-1A. Affects other than marine units. Amendment, June 8, permits deliveries on A-9 or higher ratings assigned by PD-4X or PD-25A. Manufacturers must file PD-663 with WPB by 15th of each month, listing unfilled orders at end of preceding month and production schedule.

L-123: Industrial Equipment, May 26, 1942, amended Aug. 27. Limits sales to A-1-c or higher ratings. Covers conveying machinery, mechanical power transmission equipment, industrial fans and blowers, turbo blowers, industrial compressors and pumps, electric motors 1 horsepower and over, industrial hand trucks, stationary steam engines except marine and generator sets, industrial air washers and heat exchangers, passenger or freight elevators, electric controls for motors 1 horsepower and over.

L-126: Refrigeration & Air Conditioning Machinery, effective July 3, 1942, last amended March 27, 1943. Provides for specifications and restrictions for production of such equipment. Schedule I—Restricts production of self-contained drinking coolers to 5, 10 and 20 gallon marine types; Schedule II—Permits production of certain types of water-cooled condensing units for specific uses; extends restrictions on use of metal bases and fan shrouds; prohibits use of copper or copper-base alloy tubing or pipe for specific purposes; Schedule III—Changes amounts of nonferrous metals used in making refrigeration condensing units under certain specified conditions; imposes controls on use of steel tubes in water-cooled condensers; Schedule IV—Reduces number of sizes and types of refrigeration valves, fittings and accessories; requires substitution of ferrous metals for nonferrous in construction of certain essential parts; Schedule V—Restricts output of commercial reach-in refrigerators to four sizes and of walk-in refrigerators to nine sizes; limits use of metals used in component parts; Schedule VI—Prohibits use of copper or copper-base alloy tubing or pipe for refrigerant connections with certain stated exceptions; prohibits use of copper tubing or pipe for service connections.

L-128: Automotive Exhaust Valves, effective July 1, 1942. Permits use of chromium and nickel only in valve head. Prohibits sale unless consumer turns in used valve which cannot be reconditioned. Valves made under specifications for medium and heavy trucks may not be used in passenger cars or light trucks. Does not apply to Army, Navy or Maritime Commission orders.

L-131: Officers' Military Insignia, effective July 20, 1942. Limits use of copper in "gold color" insignia and prohibits use of aluminum, cork, nickel and nickel silver, rubber, tin, cadmium, rhodium and chromium in making officers' military insignia. **L-131-a,** Aug. 28, 1942, permits sales by persons certified by Adjutant General, War Department.

L-134: Instruments, Valves and Regulators, effective May 26, 1942, last amended Jan. 30, 1943. Sets up specifications for 28 items forming component parts of industrial processing instruments, valves and regulators. Limits use of instruments containing chromium and nickel to certain operating conditions. Prohibits deliveries against orders rated below A-1-c, repair parts below A-8, except for orders from specified government agencies. Restricts manufacturing and deliveries in accordance with specified uses. Exempts instruments containing no nickel or chromium; instruments made before May 26, 1942; safety valves.

L-135: Wood Upholstered Furniture, Aug. 8, 1942. Bans production of furniture containing iron or steel other than joining hardware.

L-136: Church Goods, effective June 23, 1942, last amended Feb. 11, 1943. Limits use of specified critical materials in class A products. Prohibits use in class B products.

L-139: Dental Equipment, June 25, 1942. Schedule I reduces by about 50% types and sizes of dental excavating burrs permitted to be manufactured.

L-140: Cutlery, effective June 1, 1942, last amended Aug. 25, 1942. Iron and steel use limited to following percentages of rate for year ended June 30, 1941; 100% in making industrial food processing instruments; 60% for cutlery used in homes, shops, hotels, etc., to prepare foods; 35% for cutlery used in serving and eating food, and ordinary scissors. Use banned for unessential cutlery. Exempts orders placed by War Shipping Administration and military orders placed by jobbers, wholesalers and other dealers.

L-142: Metal Doors, effective Sept. 16, 1942. Prohibits production of metal doors, frames and shutters, except A-10 repair orders and fire doors meeting certain specifications and airplane hangar doors.

L-143-a: Rubber Processing Equipment, issued March 26, 1943; supersedes L-143, revoked April 9, 1943; Places control in Office of Rubber Director. Prohibits production reconditioning and rebuilding of 81 specified types of equipment without authorization obtained on PD-352 (Revised).

L-144: Laboratory Equipment, effective June 12, 1942; last amended March 24, 1943. Purchases over $50 must be authorized by WPB. PD-620 is purchase application. Prohibits sale or delivery of equipment containing critical material except for certified essential uses. Exempts reagent chemicals from restrictions. Orders placed by armed forces and specified government agencies are exempt.

L-145: Aircraft Bearings, effective June 9, 1942. Restricts production of control and pulley bearings to certain specified makers.

L-146: Welding Rods, Electrodes, effective June 13, 1942. Revoked Dec. 9, 1942. Purchase applications for repair work should be sent to local WPB office for less than $50 and to Washington office for over $50, if preference rating is necessary.

L-147: Machine Tools, effective July 10, 1942.

Prohibits production of tools calling for special electrical specifications after July 15.

L-148: Wire Communication Equipment, effective Sept. 7, 1942; revoked April 1, 1943. Superseded by U-5.

L-151: Watthour Meters, July 31, 1942. Prohibits production of household electric meters after Sept. 26, 1942. Curtails output in the interim to 2.5 per cent of number made in year 1941. No deliveries allowed unless: for use of Army, Navy, Maritime Commission, or War Shipping Administration; delivered under preference rating assigned by P-46 as amended; authorized by WPB. Repair parts not affected. Makers report to WPB by 10th each month on PD-423.

L-152: Baby Carriages, effective June 13, 1942. Confines metal use by manufacturers to iron, steel, gold, silver. Iron and steel use restricted to 6 lb. per carriage and to 3 lb. per stroller, including hardware; use per baby walker restricted to hardware. Production of carriages and strollers limited to rate during year ended June 30, 1941.

L-154: Power, Steam and Water Auxiliary Equipment, effective June 17, 1942; last amended Nov. 21. Schedule I bans use of stainless steel or nickel alloys in manufacture of water meters. Copper and its alloys eliminated from all parts except internal gears and workings. Tin use prohibited except as alloy in copper. Permits use up to 60% of materials and parts on hand July 1 but output cannot exceed 12½% of shipments during year ended May 31, 1942. Schedule II, prohibits copper, nickel and tin use in steam surface condenser tube sheets. Requires condenser tubing to be made of admiralty or muntz metal. Schedule III issued Nov. 21, 1942; revoked March 1, 1943.

L-157: Hand Tool Simplification, effective July 20, 1942, last amended April 15, 1943. Authorizes issuance of schedules specifying types, sizes and specifications of various tools permitted to be manufactured. Schedule I covers hand shovels, spades and scoops; Schedules II and III, axes, saws, hatchets, adzes, light hammers; Shcedule IV, heavy forged hand tools; Schedule V, gardening implements and industrial tools. Limitations on forged axe items do not apply to Lend-Lease or BEW licensed export orders.

L-158: Automotive Replacement Parts, July 4, 1942; last amended March 11, 1943. Prohibits producers from manufacturing and buying at a rate which will make value of inventory greater at end of any quarter than it was on April 1, 1943. Allows producers 60-day period each quarter within which to adjust their inventories. New part may not be sold if replaced one can be reconditioned. Consumers not required to turn in old parts in exchange for new unless the part is installed by producer or distributor. Permits manufacturers to schedule production as if orders received had a rating of AA-2X.

L-159: Plastics Molding Machinery, effective July 4, 1942: last amended April 14, 1943. Prohibits production and delivery except as specifically authorized by WPB. Delivery of maintenance or repair parts must be specifically authorized except: from inventory to repair breakdown; for maintenance of a minimum practicable working inventory. Exempts used fixtures and small sample molds producing pieces of 30 grams or less. File PD-741 for authorization required.

L-161: Electric Fuses, effective Sept. 9, 1942; last amended Dec. 31, 1942. Prohibits use of copper or its alloys to make fuses, other than current carrying parts. Bans assembly of fuses containing copper other than current carrying parts. Restricts manufacturers' sales to other manufacturers or to orders rated A-1-j or higher, except orders covered by L-158.

L-163: Turbo-Blowers, effective Aug. 7, 1942. Requires authorization on PD-616A for purchasing blowers covered by order definitions. Amended Oct. 1 to include blowers with capacity of 5000 cu. ft. per min. or more.

L-168: Blackout and Dimout Lighting Fixtures, effective Sept. 18, 1942. Prohibits manufacture or sale of such fixtures not conforming to specifications of War and Navy Departments and Maritime Commission. Provides conditions under which approved fixtures may be sold, and restricts metal use in their manufacture.

L-170: Farm Machinery, effective Oct. 21, 1942; last amended April 6, 1943. Restricts manufacture for the period ending Sept. 30, 1943, to specified quotas for new machinery and 160% for repair parts, based on the 1940-41 rate. Establishes quotas for export. Orders rated AA-3. Producers file PD-630 by 10th of each month; also PD-387 if exporter. **L-170-a,** Nov. 7, 1942, bans use of copper and copper base alloy products in manufacture of farm tractors, engine power units, or repair parts other than for specified purposes.

L-172: Heat Exchangers, effective Aug. 5, 1942; last amended Nov. 2, 1942. Provides for complete allocation. Requires authority on PD-615A to place or accept orders. Restrictions on surface condensers covered in M-117.

L-173: Space Heaters, effective Aug. 5. Prohibits production of space heaters calling for use of fuel oil or gas, except to fill military orders. Replacement parts may be made. Amended Sept. 19 to exempt gas units.

L-174: Manufactured Gas, effective Aug. 25, 1942; last amended Jan. 20, 1943. Provides for adequate deliveries to war and essential industries. Limits civilian use to existing consumers. Prohibits installation of gas equipment if gas delivery for such equipment is not permitted.

L-175: Watches, effective Aug. 7, 1942. Prohibits sale of railroad standard watches by manufacturers except to fill orders for Army or for time service employes of railroads.

L-176: Portable Electric Fans, effective Sept. 7, 1942; last amended April 7, 1943. Freezes stocks in hands of manufacturers. Application for release must be made to made to WPB on PD-556. Limits output to marine types for shipboard use. Permits manufacture of fan blades and electric motors; use of copper in production of parts which conduct electric current; in bearings, if no other material is practicable. Inventories limited to volume of sales in preceding six months and must be reported on PD-665 by 10th of each month.

L-180: Replacement Storage Batteries, effective Aug. 29, 1942; last amended Jan. 5, 1943. Limits output in 1943 to 100% of 1941 sales on following quarterly basis: 22½% in 1st and 2nd; 30% in 3rd; 25% in 4th. Limits inventories to 1/3 of 1941 sales for producers; 90-day supply for distributors. Users required to turn in old batteries when buying replacements. Producers report quarterly shipments on PD-765.

L-182: Commercial Cooking Equipment, effective Oct. 1, 1942. Restricts use of iron and steel for some types to 75% of 1941 total; bans output of other specified types. Apply for sales authorization on PD-638A. Inventory reports due by 10th of month on PD-638.

L-183: Electronic Equipment, effective Oct. 3, 1942. Prohibits production in excess of a minimum inventory required to meet deliveries on orders rated A-3 or higher, in no case exceeding 12½% of total 1941 sales. Bans transfers except on orders rated A-3 or higher. Exempts devices used in hearing aids, telephone and telegraph equipment, medical and therapeutic equipment and light and power equipment. **L-183-a,** Oct. 26, 1942; last amended Dec. 16, 1942. Effective Feb. 15, 1943, producers must schedule deliveries under precedence list issued by Joint Communications Board of Army and Navy.

L-185: Water Heaters, effective Dec. 19, 1942. Prohibits manufacture: of gas fired and oil fired water heaters except for war housing; of solar water heaters. Restricts amount of metal used in production: of coal fired water heaters to amount used in like 1941 quarter; of indirect water heaters to 50% of amount used in like 1941 quarter. Prohibits manufacture of metal jackets for water heaters with two exceptions. Limits use of copper or copper base alloy to controls and safety devices and for specified classes of contracts. Permits use of copper in making repairs and requires return of all replaced copper scrap to scrap dealers. Restricts amount of metal used to make repair parts to amount used for same purpose in like 1941 quarter.

L-187: Cast Iron Boilers, effective Nov. 6, 1942; last amended Feb. 13, 1943. Bans production of low pressure boilers built to use oil or gas; output of other types permitted for war housing and civilian replacement needs, subject to authorization by WPB on form PD-704. Manufacturers in each of first six months of 1943 may use 13% and may ship boilers containing 4½% of iron and steel put into process during 1940. Manufacture of parts to convert from oil or gas burning to solid fuel exempt from restrictions. Manufacturers must file PD-639 by 10th of each month.

L-188: Loose Leaf Metal Parts, Aug. 3, 1942. Limits quarterly use of iron and steel to make blank book and loose-leaf metal parts and units to 7.5% of 1941 use. Bans making of certain books and parts.

L-190: Scales, Oct. 10, 1942. Prohibits production of: household scales; commercial scales for retail trade. Limits output of clinical mailing parcel post and dietetic scales to 25% of 1941 total. Bans use of brass in major parts of industrial scales and in all weights, except for analytical balances. Restricts sales. Permits production of repair parts for all scales, except household up to 150% of 1941 production.

L-192: Construction Machinery, Nov. 7, 1942; last amended Nov. 17, 1942. Halts production for civilian use of certain types needed for armed services; all other production restricted to approved schedules. Civilian purchase and use of new equipment on Schedule A for private account permitted only under specific WPB authorization. Private owners must register 30 days prior to sale, lease or use on any other project any unit listed in Schedule A on WPB form 1159. Application to purchase made on PD-556. Production schedules, inventory reports and shipping schedules filed on PD-697 by 15th of each month.

L-193: Conveying Machinery, effective Oct. 7, 1942; last amended April 5, 1943. Requires purchasers to file PD-681. Manufacturers must file PD-682 by 15th of month, showing production and delivery schedules. All orders must be authorized by WPB with certain exceptions. Used conveying machinery and mechanical power transmission equipment exempt. Imposes restrictions on use of metals in specified machinery.

L-196: Used Construction Equipment, effective Aug. 31, 1942; last amended Jan. 9, 1943. Bans export of equipment unless by armed forces or upon WPB authorization.

L-197: Steel Shipping Drums, effective Sept. 14, 1942, last amended Jan. 29, 1943. Prohibits use of new or used drums for packing specified list of products. Manufacturers must emboss "X" on bottom of drums made after Sept. 30. Prohibits sale or delivery of new or used drums without "X". Exempts drums: for repair and maintenance operations aboard ship; exceeding 30-gal. capacity lighter than 23-gage; and containing materials incorporated in certain military items.

L-199: Plumbing, Heating Tanks, effective Dec. 19, 1942. Prohibits with minor exceptions manufacture or installation of metal tank supports, metal tank jackets, and installations of nonferrous metal, stainless steel or monel metal tanks. Prohibits use of copper or copper-base alloy in manufacture of tanks but permits use in making repairs, requiring all replaced copper scrap returned to scrap dealers. Provides specifications and simplified practices for manufacture of black iron and galvanized iron range boilers and expansion tanks. Provides for manufacture or repair and replacement parts but restricts use of metal in any quarter to not more than amount used in like production in corresponding 1941 quarter.

L-201: Tire Chains, effective Oct. 31, 1942. Use of metal restricted to low carbon steel. Bans metallic plating. Restricts sizes and types.

L-203: Combat Measuring Instruments, effective Oct. 13, 1942. Prohibits sales of specified types unless authorized. Purchasers must apply on PD-674. Manufacturers must file PD-675 and PD-676.

L-204: Telephone Sets, effective Oct. 17, 1942; last amended Feb. 27, 1943. Restricts production of civilian telephone sets, including intercommunicating systems. Manufacture of repair or replacement parts unaffected.

L-205: House Trailers, effective Nov. 1, 1942. Limits production by any manufacturer to 150 in any one month. Restricts sales.

L-206: X-Ray Equipment, effective Oct. 20. Prohibits manufacture of any models or types other than those listed in Schedule A, used principally by Army and Navy. Sales restricted to specified government agencies or those authorized after filing PD-556.

Exempts X-ray tubes, accessories, parts for maintenance and repair; used and rebuilt equipment.

L-208: Gold, effective Oct. 8, last amended Nov. 19, 1942. Prohibits production of gold and breaking out of new ore, except by mines assigned serial numbers under P-56. Certain small mines exempted. Bars disposal of any machinery or equipment of types listed in schedule A of order P-56, from a non-essential mine without specific permission of WPB.

L-209: Wire Cloths, effective Nov. 4, 1942. Prohibits any pulp or paper mill from increasing its inventory of wire cloths held in stock for a machine unit above the number specified in an official schedule.

L-211: National Emergency Steel Products, effective Oct. 23, 1942; last amended March 17, 1943. Limits sizes, shapes, and sets up specifications of: concrete reinforcement steel; wheels and tires; barbed wire, wire fencing, poultry netting; structurals; axles and forgings; mechanical tubing; rails and track accessories; carbon steel plates.

L-212: Incandescent Lighting Fixtures, effective March 31, 1943. Restricts use of metal in manufacture and imposes certain simplifications and standardization.

L-214: Medical Equipment, effective Oct. 24, 1942. Authorizes issuance of schedules establishing simplified practices. Restricts materials used in production and subsequent disposition.

L-215: Textile, Fiber, Clothing, Leather Machinery, effective Dec. 26, 1942. Bans production and sale of machinery without specific authorization of WPB. Apply for authorization on PD-744 unless machinery is to be part of new project in which case PD-200 authorized by Construction Division is sufficient. Excludes such machinery as boilers, motors, cranes, etc.; machinery covered by L-91 and specified used machinery. Textile machinery maker must file by 15th of each month on PD-746 complete production and sales schedule.

L-216: Portable Tools, effective Dec. 4, 1942. Provides schedules for standardization and simplification of portable electric tools, including length of power cable or electric cord.

L-217: Construction Machinery, effective Nov. 17, 1942; last amended April 27, 1943. Denies use of alloy steel in manufacture of scrapers, other than those listed on schedules approved by WPB. Prohibits use in production or assembly of scrapers or repair parts and in angle-dozers and bulldozers; except for use in power control units, prime movers, and antifriction bearings if metal is in inventory on Feb. 1, 1943. Restricts number of sizes and types of portable jaw crushers, roll crushers, construction concrete mixers; truck mixer-agitators; contractors' dewatering and supply pumps.

L-221: Electric Motors, issued Dec. 2, 1942, last amended Jan. 15, 1943. Prohibits any manufacturer from accepting any order or from making any delivery, unless motors comply with certain standard specifications and design. Restricts deliveries to AA-3 or higher orders.

L-222: Floor Maintenance Machines, Industrial Vacuum Cleaners, effective Jan. 8, 1943. Prohibits production of floor sanding, finishing and maintenance machines after March 15 and limits production of industrial vacuum cleaners. Prohibits fabrication of parts. Restricts sale rental, transfer of specified type.

L-223: Hard-Surfacing Material, effective Dec. 2, 1942. Restricts delivery to AA-5 or higher orders, except for research work or field tests; use for maintenance and repair to a specific list of essential types of equipment. Limits use for new products to those specifically permitted by the order; inventories to a 60-days' supply.

L-225: Electrical Conduit, Metallic Tubing, Raceways, effective Dec. 16, 1942. Prohibits installations, sales and deliveries on ratings under A-1-j. Conduits and tubing may be installed for extensions less than 12 ft. Restricts use of metal in manufacture of rigid conduit in 1943 to 40% 1941 output and by individual producers quarterly to 10%, of raceways to 50% and by individual producers quarterly to one-eighth.

L-226: Printing Machinery, effective Jan. 4, 1943. Bans production except for armed forces outside of continental U. S. or on shipboard. Limits delivery of machinery less than 5 yrs. old to orders approved by WPB. Orders for replacement parts and operating supplies take AA-1 rating and old parts must be returned to manufacturer or sold as scrap. Exempts graphic arts machinery having value of $25 or less.

L-227: Fountain Pens, Pencils, effective Dec. 7, 1942; last amended Feb. 23, 1943. Limits production. Restricts use of iron and steel, copper, copper-base alloys, crude rubber or reclaimed rubber. Manufacturers must file PD-721 by 20th of each month.

L-229: Railroad Equipment, effective Jan. 1, 1943. Revoked April 5, 1943. Superseded by order P-142.

L-230: Military Arms, effective Nov. 16, 1942; last amended Jan. 6, 1943. Bans sale, transfer or delivery of military arms, except to a governmental agency; for export on an authorized export license; with specific authorization of WPB; or non-operating arms to a scrap dealer or melter. Rifles, pistols and shotguns not covered unless they are automatic models. Manufacturers disposing of discarded arms must file monthly reports with WPB.

L-234: Industrial Type Instruments, effective Dec. 28, 1942. Requires manufacturers of industrial thermometers, pressure gages, control valves and other specified instruments to file monthly reports, showing productive capacity, requested future deliveries and previous month's production.

L-236: Hardware, issued Jan. 9, effective March 1, 1943; last amended Feb. 25, 1943. Establishes simplified practices with respect to types, sizes, forms, specifications for builders' finishing hardware. Provides for manufacture of special export items. Exempts articles for use by armed forces, aboard ship, railroad, and protection of power equipment.

L-237: Woodworking Machinery, Light Machine Tools, effective Feb. 2, 1943. Limits production of tools listed in schedule A to a 60-day supply for orders rated A-1-a or higher; and to 16⅔% of 1941 sales for any 60-day period. Restricts distributor's inventories to 5 for each specified size and type of tool listed on schedule A.

L-238: Sun Glasses, effective April 23, 1943. Permits use of metal in manufacture of sun glasses or cases for sun glasses only to extent designated in schedule A of the order. Exempts aviation sun glasses manufactured for the Army, Navy, and Lend-Lease purposes, if specifications for such glasses cannot be fulfilled within these limitations. Exemption does not apply to glasses purchased by Army or Marine Corps Post Exchanges or by Navy Ship's Service Departments. Permits use of steel for spring clips in slip-over types of sun glasses; for half-hinges, hinge pins and rivets, snaps for cases; and core wire in plastic temples, if manufactured from wire in the producer's inventory on April 23 or from wire obtained by him through a special sale as defined in Priorities Regulation No. 13. Permits use of brass for barrel-hinges, hinge pins, rivets and screws to fill orders with preference ratings of AA-5 or higher. Permits use of copper (strike), zinc, silver, gold and palladium for electroplating. Finished parts may be assembled into products that can be completed on or before May 23.

L-246: Pumps, effective April 12, 1943. Forbids sales after May 22 except on approved purchase orders; deliveries after May 12 except for the fulfillment of approved purchase orders. Assigns AA-5 rating to approved purchase orders. Exempts orders for repair parts (1) in an amount not exceeding $500 for any single pump or 50% of original sales price of pump to be repaired: or (2) in any amount in cases where an actual breakdown has suspended or threatens to suspend operations.

L-249: Dental Equipment, effective Jan. 20, 1943. Prohibits production of dental units and dental chairs except as authorized by WPB. Manufacturers must file production, shipping schedules by 15th of each month on PD-774. Manufacture of specified equipment banned without WPB authorization or for: Army, Navy, Lend-Lease, or export under BEW license.

L-250: Controllers for Electric Motors, effective Feb. 13, 1943. Provides specific simplifications practices. Bans use of stainless steel except where necessary for operation of the controller; use of aluminum, copper, chromium, nickel, cadmium or their alloys for non-functional parts. Only orders rated AA-5 or higher can be accepted after Feb. 28. Restrictions on manufacture are effective for orders placed after March 1, for delivery after May 14. Exempts controllers for use aboard ship owned by Army, Navy, Maritime Commission or WSA.

L-252: Valves and Valve Parts, effective Jan. 23, 1943; last amended March 2, 1943. Prohibits production after May 1, 1943, except as specifically authorized by WPB or in conformity with stated specifications. Exempts cast or forged valves manufactured before May 1, 1943.

L-253: Motor Truck, Trailer Bodies, effective Feb. 10, 1943. Prohibits production of all types of tank bodies, other than 800 oil tanks authorized under L-1-g, permits use of iron and steel in only specific parts. Prohibits manufacture of dump bodies except one light and one medium model for which exact specifications are given. Exempts Army and Navy orders for 60 days and specified types thereafter.

L-254: Air-cooled Engines, effective March 15, 1943. Prohibits manufacture or assembly of any engines not listed in Schedule A. Exempts for aircraft and motorcycle engines as well as following: completion of contracts entered into prior to March 15: use of finished and partly processed parts; manufacture of parts for repair and maintenance.

L-264: Rectifier Tubes, effective March 10, 1943. Manufacturers must file quarterly production and delivery schedules. Bans use of metals in bases for tubes except: iron and steel; copper, copper base alloys and zinc in protective coatings; copper or copper base alloys in military orders; brass in eyelets or pins; or as authorized by WPB on PD-556.

L-268: Oxy-acetylene Apparatus, effective Feb. 24, 1943. Restricts use of nonferrous metals and stainless steels in production of parts for oxy-acetylene apparatus. Bars purchase orders on preference ratings below AA-5; restricts inventories of repair parts to 60 days' supply and spare equipment of 10% of operating equipment. Restrictions do not apply on apparatus for under-water use; for Armed Forces, Maritime Commission, or War Shipping Administration; for repair parts.

L-269: Mining Equipment, effective March 11, 1943. Manufacturers must operate in accordance with proposed production and delivery schedules submitted by them on PD-815 in triplicate by 15th of each month.

L-270: Automotive Vehicle Repair and Maintenance Parts, effective April 5, 1943. Prohibits production of specified maintenance equipment, including combustion analyzers, frame straightening machines, gasoline mileage testers. Limits production of specified items, including axle-bending bars, front-end combination inspecting machines, tire pumps, and certain types of automotive jacks to 20% of amount sold during 1941. Permits production equal to 75% of number sold in 1941 of specified items, including tire air gauges, crank shaft and cylinder grinders, piston reamers, and transmission jacks. Prohibits use of copper or copper-base alloy products except: for conducting electric current; in bearings, bushings, and check valves; where non-corrosive metal is required; and when so used, such copper products must be reduced to the minimum quantity and minimum gauges, sizes, and grades necessary for proper operation of the equipment. Prohibits use of aluminum, steel or other critical materials where use of less critical material is practicable. Restricts sale or delivery to orders bearing preference rating AA-5 or higher.

L-272: Industrial Type Instruments, effective Feb. 24, 1943. Simplifies and standardizes designs and types of control valves, liquid level controllers, pyrometers, resistance thermometers. Exempts valves and controllers used on ships other than pleasure craft; pyrometers and resistance thermometers for laboratories or for ship use other than pleasure vessels.

L-280: Fans, Blowers, effective Feb. 17, 1943. Requires scheduling delivery by manufacturers after Feb. 28. Bars all delivery unless on WPB approved order.

L-288: Grey Cast Iron, Malleable Iron, Brass and Bronze Pipe Fittings, effective April 17, 1943. Establishes sizes for and standards of fittings permitted to be produced or sold.

"M" Orders

M-1-d: Aluminum Scrap, effective Jan. 7, 1942, revoking P-12 and M-1-c; last amended March 16, 1943. Prohibits use of scrap, except home scrap, without authority of WPB. Does not apply to virgin aluminum producers or approved smelters. Foundries may remelt its gates, sprues, risers and defective castings. Every plant generating 500 pounds or more of scrap per month must segregate scrap at the machine. All 17S, 24S and 52S alloy scrap in solid form must be sold to any primary producer if amount generated is 20,000 lb. or more monthly. All other segregated scrap to producers, approved smelters or dealers. Identity of segregated scrap must be certified to by seller. Order affects only scrap containing 15% or more aluminum. Toll agreements must be specifically authorized by WPB. Scrap producers (except ingot producers and smelters) of 500 lb. monthly file WPB-317 monthly; other producers PD-828 quarterly. All melters and smelters file PD-272; all dealers PD-249 by 10th of month.

M-1-g: Aluminum Pigment, Paint, effective March 10, 1942. Prohibits manufacture or sale, except retail, unless Director of Industry Operations approves application. Pigment manufacturers and paint formulators and jobbers report stocks to WPB by 15th of each month.

M-1-h: Bauxite and Alumina, effective Aug. 1, 1942. Provides full allocation.

M-1-i: Aluminum, effective Aug. 18, 1942, revoking M-1-e and M-1-f; last amended March 31, 1943. Provides for complete allocation control of virgin and secondary metal. Each producer, approved smelter and fabricator must file, on PD-26A, a shipping schedule for each month by 15th of second preceding month. Prohibits use, except as specifically authorized on PD-26A, or as otherwise specifically authorized by WPB (not including allotments, authorized controlled materials orders or authorized production schedules under any CMP Regulation) in any article except: implements of war; aircraft; alloys not exceeding 15% aluminum by weight and the aluminum used and reported on CMP-13; aluminizing or calorizing; anodizing equipment; carbometer wire; cathodes for electrolytic refining of zinc; cauls for use in manufacture of plywood for military purposes; chemical processing equipment; closures for parenteral solutions and blood; diesel engines, the following parts, only, out of high-grade aluminum: rotors for centrifugal type superchargers; fixed electrolytic and paper condensers, and mica condensers; flame arrestors, tube blank only; for export in forms and shapes described as a controlled material in CMP Regulation No. 1; certain orthopedic equipment; pistons, the following types, only, out of high-grade aluminum: for aircraft engines, tank engines, tank engines and high performance marine gasoline engines, and for Diesel engines where piston diameter is 7½ inches and over; repair and maintenance parts for mechanical or electrical equipment; rotors for electric motors; certain scientific research and development; thermit reaction; wire for metallizing and rod for welding; X-ray filters. Low-grade aluminum may be used in the manufacture of: anhydrous aluminum chloride, connecting rods for one or two cylinder air-cooled gasoline engines; Diesel engines, the following parts only: rotors, housings and end plates of root-type blowers and diffuser rings for centrifugal type super-chargers; hydraulic brake pistons; match plates, patterns, core boxes, core dryers and snap flasks; pistons; steel deoxidizer; portable electric and pneumatic tools. Restrictions do not apply in manufacture of certain repair parts. Aircraft product makers must report inventories on PD-40A by 20th of month; other users must file CMP-7. All toll agreements must be authorized by the Director on PD-114.

M-2-b: Magnesium, effective Nov. 14, 1941, revoking M-2 and M-2-a.

Applies to all materials and products, including scrap, principal ingredient of which is magnesium. Deliveries are subject to monthly allocation by WPB. Magnesium products may be used only on orders carrying a rating of A-1-j or higher. Alloying any material with magnesium without approval of WPB prohibited. All material, in whatever form, not being used to fill orders with ratings of A-1-j or higher, must be disposed of to a producer or approved smelter.

Producers, fabricators, secondary smelters must file PD-26-M monthly by the 20th with Aluminum and Magnesium branch, giving shipping schedules. Users report stocks, receipts, disposition on PD-173.

M-6-a: Nickel, effective Sept. 30, 1941, last amended March 31, 1943. Deliveries to be made by producers and distributors only as authorized by WPB, except to Metals Reserve Co. Order covers nickel salts, oxides, carbonates and solutions, concentrates and residues from which nickel commercially recoverable.

M-6-b: Nickel, effective Jan. 20, 1942, last amended Oct. 3, 1942. Restricts use, except where specifically authorized to implements of war and other products certified by Army-Navy Munitions Board.

M-6-c: Nickel Scrap, effective April 23, 1942. Requires segregation by all persons handling nickel scrap. Dealers may make deliveries only to melters being allocated nickel and for use in products for which allocation made, or to melters with orders requiring nickel and rated higher than A-2. Persons generating scrap containing more than 500 lbs. of contained nickel per month or who have that amount on hand at end of month, or who have on hand at end of month more than 30 days' accumulation of scrap they produced (if nickel content more than 100 lbs.) required to report by 15th of each month. Use PD-149, 150, 151 for iron and steel scrap.
Amendment, June 19, 1942, requires segregation of ferrous nickel scrap in same manner as provided in M-24-c. Order provisions cover scrap containing 1% or more nickel. Dealers prohibited from melting scrap without authorization.

M-9-a: Copper, effective Aug. 2, 1941, last amended March 4, 1943. Supersedes M-9. Deliveries by refiners, dealers, brass mills or wire mills must be authorized by WPB. Toll agreements must be approved by WPB. Order prohibits sale of copper and its products by mills or foundries except on A-1-k or higher rating. Control of allocation of copper to foundries and ingot makers is placed in M-9-b. Places control of warehouse sales of brass, wire mill products entirely under CMr regulation No. 4. PD-76 is copper allocation certificate; PD-123 is delivery report. Users file PD-59D as revised to apply for monthly requirements for domestic consumption.

M-9-b: Copper and Copper-Base Alloy Scrap and copper base alloy (brass and bronze) ingots, effective Sept. 30, 1941, last amended March 11, 1943. Brass mill scrap may be delivered only to a scrap dealer or brass mill. Dealers may deliver only to another dealer or brass mill. No. 1 or 2 copper scrap may be delivered only to a dealer or person specifically authorized by WPB. Copper clad steel scrap and fired artillery and cartridge cases may be delivered in excess of 10 lb. or copper base alloy scrap containing 0.1% or more beryllium may be delivered only to persons authorized by WPB to receive such scrap. Scrap other than above mentioned grades may be delivered only to a scrap dealer or person authorized by WPB. A scrap dealer may not accept additional scrap if inventory exceeds amount sold during the preceding 60 days. Material bought as scrap must be sold as scrap unless otherwise authorized. Specific authorization required to process scrap or alloy ingots, except by brass mills which can process brass mill scrap without authorization. Ingots may be delivered only on specific authorization. Alloy ingots can be delivered only to a person authorized by WPB. Fabricators, except utilities, may not use or remelt scrap produced in their own operations, or dispose of it except by sale, without permission. No fabricator may keep more than 30-days' scrap accumulation, unless total is less than 1 ton. No copper or brass mill scrap may be delivered under future conversion or toll agreements, unless approved by WPB. Obsolete scrap wire or cable used by public utility in own operations must be over 5 ft.; monthly use limited to 5 tons. Allocation certificates must be surrendered by foundries and ingot makers to dealers when orders placed. Industrial producers of more than 500 lb. monthly file PD-226 by 10th of each month. Ingot makers file PD-731 and brass foundries PD-59B by 5th of each month. Scrap dealers file PD-249 with Bureau of Mines by 10th of each month.

M-9-c: Copper, Oct. 21, 1941, last amended April 6, 1943. Bans use of copper or copper base alloy in manufacture of any one of more than 100 civilian articles. Permits copper use for essential operating, maintenance and repair parts for railroad cars, locomotives, equipment. Freezes stocks of copper screenings. Permits use of copper insignia and jewelry already fabricated. Limits use in stove valves and controls. Permitted uses named in "Military Exemption List." Limits use of copper engraving plates to those in engraver's possession Dec. 31, 1942, and to old plates. Engravers must sell as scrap during each quarter 3 lb. of old plates for each pound of copper products engraved. Amounts used by printing industry for other purposes limited to 60% of base period.

M-9-c-1: Copper in Shoes, effective March 31, 1942, use of copper in making shoe findings (eyelets, hooks, etc.) prohibited.

M-9-c-2: Copper in Jewelry, prohibits copper use in making jewelry after May 15, 1942.

M-9-c-3: Copper in Printing. Bans manufacture and delivery of paste, ink or leaf with bronze powder after Dec. 27, 1942, if powder manufactured after March 31, 1942.

M-9-c-4: Copper in Building, effective July 22, last amended Oct. 28, 1942. Restricts use for repairs to 25 lb. or less and then only when users possessed them on Oct. 27. Deliveries may be made only to scrap dealers, brass mills or government agencies.

M-11: Zinc, effective July 11, 1941, last amended Feb. 9, 1943, setting up complete allocation, including remelt and scrap. Consumers apply to WPB monthly on PD-94A for allocation certificate, forwarding certificate to producer to receive shipment. Dealers report inventories and deliveries on PD-450 by 15th each month. Limits delivery by dealers to orders rated AA-5 or higher. Permits shipment of scrap only to dealers, producers and manufacturers for use in specified products. **M-11-a,** effective June 1, 1942; last amended March 20, 1943 requires zinc oxide producers to set aside quantities monthly for pool, as ordered by WPB. Producers may satisfy commitments to any one customer in full up to 2000 lb. monthly. Buyers file PD-62 to request allocation following month. **M-11-L,** prohibits delivery of zinc dust except: in amount specified in WPB's allocation certificate; 75 lb. or less monthly; to Metals Reserve Co., or under BEW export license. Ban production under toll agreements. Producers file PD-758 monthly; application for allocation certificate must be filed by 15th of month on PD-755.

M-15-b: Rubber, effective Dec. 11, 1941, last amended April 13, 1943. Supplants M-15. Restricts use in making any civilian product to specific WPB allocations. Stocks and consumption reported by 15th each month to WPB on PD-49. **M-15-c,** effective Dec. 27, 1941, restricts sales of new tires and tubes, subject to Rationing Regulation No. 1, **M-15-b-1,** June 12, 1942; last amended Jan. 22, 1943. Sets up complete specifications for manufacture of 31 classes of products. **M-15-f,** July 31, bans rubber cement use in certain products. **M-15-g,** Jan. 17, 1943, provides that no rubber tires for industrial power trucks be delivered for replacement purposes except to fill A-1-a or higher orders.

M-17: Pig Iron, Aug. 1, 1941; last amended March 28, 1942. Customers submit monthly requirements by filing with producers by the 5th of the month on Form PD-69. By the 5th of each month customers must file Form PD-70 with Iron and Steel Branch, WPB, showing stocks, consumption and requirements for following month. Producers must file by the 12th PD-71, by 15th PD-71D, covering proposed shipments for coming month. Such shipments may not be made until approved by WPB. All tonnage allocated on PD-71C.

M-18-a: Chromium, Nov. 29, 1941; last amended Feb. 4, 1942. Supplants M-18. Covers ores or concentrates, ferrochromium and combinations with other elements, chromium refractory material and scrap or secondary material. All melting and deliveries must be authorized by WPB. Use of chromium oxide for manufacture of chromium chemicals from ores or concentrates must not exceed monthly average consumption during period July 1, 1940, through June 30, 1941.

M-18-b: Chromium Chemicals, effective March 26, 1942, last amended Jan. 7, 1943. Removes previous restrictions on use. Limits inventory to 30-day supply.

M-19: Chlorine, effective July 26, 1941; last amended July 6, 1942. Provides for direct allocation. Places producers' shipments of

calcium hypochlorite and chloride of lime under allocation.

M-20-a: Calcium-Silicon, effective Nov. 29, 1941. Revokes M-20. All shipments are under direct allocation.

M-21: Iron and Steel, Aug. 9, 1941; last amended April 1, 1943. Prohibits deliveries of iron and steel products except: on authorized controlled material order; prior to July 1, 1943, on A-10 or higher ratings; by distributors to extent permitted by CMP Regulation No. 4; as permitted by Priorities Regulation No. 13; as specifically authorized or directed by WPB. If purchase order can be identified by CMP allotment, number or symbol, such identification must accompany purchase order in lieu of following statement, signed by purchaser and authorized official: "The undersigned certifies to the producer and to the War Production Board that the material ordered herein is to fill orders in group classification——." Salvaged or used materials are excluded from provisions of the order. Producers file with Bureau of Census PD-138 by 15th of month to report shipments and PD-139 by 10th to report unfilled orders and contracts for products requested for shipment. Producers file with Steel Division by 12th of month PD-169 (revised) to report steel plate schedule and PD-169A to report summary of steel plate rolling schedule for succeeding month.

M-21-a: Alloy Iron, Alloy Steel, Electric Furnace Carbon Steel, effective Sept. 16, 1941, revoking M-5, M-5-a, M-5-b. Last amended April 9, 1943. Specifies quantities and forms of alloys in alloy iron or steel. Requires use of certain percentage of chrome-bearing scrap in production of stainless steel castings and rolled products. Requires use of alloy steel turnings in an amount not less than 8%, including machine shop turnings in an amount not less than 4 per cent, of total weight of alloy steel ingots and castings produced each month. Deliveries under toll agreements must be approved by WPB. Alloy iron or steel is defined as containing manganese in excess of 1.65%, or silicon in excess of 0.60% (5% for iron), or copper in excess of 0.60%, or any other element added to obtain a desired alloying effect. Melting and deliveries must be made only as authorized by WPB. Tool Steel as defined in M-21-h, alloy iron, alloy steel or electric furnace carbon steel castings are exempted. Buyers must describe end-use of material ordered. Producers must file PD-391, 391-A by 1st and PD-440 with WPB by 12th of month.

M-21-b: Steel Warehouses, effective Sept. 3, 1941; revoked April 1, 1943.

M-21-b-1: General Steel Warehouses and Dealers, effective April 1, 1943. Permits warehouses to deal only in those product groups and types of steel in which they dealt in first quarter of 1941 and which have been certified on PD-83-b. Restricts quantity of prime quality material which may be bought each quarter if 1940 purchases of any one group included more than 25% of less-than-prime material. Limits quarterly purchases of steel in any one product group to 150% of its base tonnage for such group. Limits orders for delivery of each type of steel to warehouse stock in second quarter (as to carbon general steel products) or in period April 1 through July 31 (as to stainless or other alloy general steel products) to quantity authorized in CMP-L-85 (a certificate of purchase.) Orders for delivery of carbon general steel products from producer to warehouse stock after June 30, or of stainless or other alloy steel after July 31, must be supported by CMP-11, filled out and signed by purchasing warehouse. After June 30 warehouses can obtain materials (using CMP-11) only to replace steel sold in previous 90 days in accordance with CMP Regulation No. 4, plus small amounts to compensate for limited scrap loss. Permits purchases for delivery to its stock from idle or excess inventories pursuant to Priorities Regulation No. 13 of general steel products in any group or type which have been certified on PD-83-b. These orders when endorsed as follows by warehouse and authorized official will be deemed an authorized controlled material order: "The undersigned certifies to the seller and to the War Production Board that this order is placed pursuant to paragraph (d) of order M-21-b-1, and is an authorized controlled material order." Provides that dealers must operate entirely on stock replacement basis and permits them to shift freely within any particular type among the various general steel products. Dealers' orders for replacement of authorized sales must be certified by following endorsement:

"The undersigned hereby certifies to the seller and to the War Production Board that the material covered by this order is to replace in stock general steel products of the same type and weight delivered by the undersigned within 90 days preceding the date of this order and in accordanace with CMP Regulation No. 4 (or Supplementary Order M-21-b). This constitutes an authorized controlled material order", signed by dealer and authorized official. Permits ear-marking of warehouse stocks for a particular claimant agency, where such ear-marking is agreed upon by the Steel Division and the claimant agency involved. Permits delivery from such ear-marked stocks only in accordanace with specific directions issued at the time the stock is ear-marked.

Warehouses must file PD-83 (revised) with Bureau of Census by 15th of each month, unless total base tonnage of all general steel products is 150 tons or less in which case PD-83 shall be filed only by 15th of July, October, and January for preceding calendar quarter.

M-21-b-2: Merchant Trade Products Warehouses and Dealers, effective April 1, 1943. Supersedes M-21-b which is revoked. Permits warehouses to place orders for certain merchant trade products up to percentage of mill production set aside for warehouses under Steel Division Production Directives. Warehouses must place their orders for such products only with producers with whom they have a base tonnage. Such orders are deemed authorized controlled material orders.

Warehouses may replace in stock, without limit as to quantity, merchant trade products of the same type it sold on authorized controlled material orders during preceding 90 days or on orders rated AA-5 or higher. Stock replacement orders when accompanied by CMP-11 can be placed with any producer and are considered controlled material orders. Warehouses obtain a separate group of merchant trade products (such as wire fence, bale ties, and other products widely used by farmers) directly from their regular supplying producers up to a specified percentage of their base tonnage, but these orders are not considered authorized controlled material orders. Requires mills to fill such orders only after all authorized controlled material orders for the same product group in the same month have been filled. Warehouse can obtain earlier deliveries on such orders by giving them status of authorized CM orders by filing with the producer CMP-11, indicating the tonnage delivered during the preceding 90 days on orders bearing allotment numbers or on orders rated AA-5 or higher. Use PD-83-e to shift total base tonnage for any of these product groups from one producer to another.

Dealers must operate entirely on stock replacement basis but can shift freely among various merchant trade products. Form PD-83-g may be used up to July 1 instead of CMP-11 to extend allotment numbers of specific claimant agencies or orders rated AA-5 or higher. File PD-83-i quarterly if base tonnage of specified products exceeds 240 net tons. Producers of products for which warehouse load has been established file PD-83-f.

M-21-c: Steel Plates, issued Feb. 16, 1942. Includes carbon and alloy steel plates 3/16-inch or thicker, over 48-inches wide; ¼-inch or thicker, over 6-inches wide; 7.65 pounds per square foot or heavier, over 48-inches wide; 10.2 pounds per square foot or heavier, over 6-inches wide. Stainless steel plate sizes are 3/16-inch or thicker, 10 inches and wider: 7.65 pounds per square foot or heavier, 10 inches and wider. Customers must file PD-298 with producers by 1st of month preceding month in which shipments required. Two copies are filed with producer, one copy with Plate & Shape Unit, WPB. Producers report to WPB daily and weekly by wire on plate shipments, and monthly on PD-169 and 169A on schedules for following month. Amendment, July 27, limits deliveries to rating of A-1-k or higher with certain exceptions.

M-21-d: High Chromium Steel, Jan. 6, last amended Nov. 18, 1942. Bans delivery or use of corrosion or heat-resistant alloy iron or steel containing 4 per cent or more of chromium without AA-5 rating or higher; A-1-k or higher if acquired prior to Nov. 18. Does not apply to fully fabricated articles or to orders approved on PD-391 for alloy wrought products.

M-21-e: Tin Plate, Terne Plate, Long Ternes, effective Feb. 3, last amended Dec. 11, 1942. Limits use for cans and closures to extent authorized by M-81 and M-104, respectively. Permits specified uses including following with maximum coating per base box: for baking pans for institutions and commercial bakers, hot dipped tin plate 1.25 lb., electrolytic plate 0.50 lb.; for dairy equipment, hot dipped plate 3.30 lb.; for cheese vats, dipped plate 11 lb.; for gas meters, dipped plate 3.3 lb. electrolytic 0.50 lb., short ternes 1.30 lb., long ternes 4 lb.; for oil lanterns, short ternes 1.3 lb., long ternes 4 lb., for textile spinning cylinders and card screens, dipped plate 1.25 lb. short ternes 1.30 lb. Producers file PD-612 by 12th of month.

M-21-g: Heat-Resistant Chromium or Chromium-Nickel Alloy iron and Alloy Steel, effective July 2, 1942. Sets up specifications for chromium and nickel content in such steels used in metallurgical furnaces, oil refineries, synthetic rubber plants, cement mill furnaces and power plant equipment.

M-21-h: Tool Steel, effective Dec. 14, 1942. Restricts monthly production of certain high molybdenum type steels to 30% monthly average melt in 2nd quarter of 1942, and deliveries to 75% of same base period in 4th quarter of 1942 and to 35% in 1st quarter of 1943. Provides that 75% of all high-speed steel orders accepted in any one quarter be molybdenum types, and not more than 25% tungsten type. Melting schedules must be filed on PD-440 by 12th of month.

M-23-a: Vanadium, replaces M-23, Dec. 20, 1941; last amended Dec. 26, 1942. Includes ores or concentrates. Ferrovanadium and combinations with other elements, chemical combinations, and scrap or secondary material containing commercially recoverable vanadium, as well as pure vanadium. Establishes full allocation, requiring deliveries to be authorized by WPB. Processing permitted only under provisions of M-21-a.

M-24: Scrap Iron and Steel, effective Oct. 11, 1941, last amended Oct. 15, 1942. On or before 10th of each month, producers who during preceding month produced 50 gross tons or more of scrap must report to Bureau of Mines, Pittsburgh, on Form PD-149, listing scrap inventory, production and sales. Dealers and brokers must file Form PD-151 by same date showing scrap inventory, purchases and sales. Consumers must report monthly on Form PD-150 their inventory, production, receipts and consumption. WPB has broad powers to control deliveries of scrap.

M-24-a, effective March 24, 1942, revoked Sept. 9, 1942, (see M-72-a). **M-24-b,** April 22, 1942, requires segregation of tin plate scrap for delivery to steel mills, prohibits mixture of such material with other scrap in bundle or car. Restrictions on consumers' inventories lifted May 23, 1942.

M-24-c: Alloy Scrap Segregation, effective June 17, 1942, last amended Oct. 13, 1942. Sets up 20 classifications of alloy steels. Requires producers of specified tonnages of scrap to segregate accumulations. Prohibits mingling of segregated scrap except in melting process.

M-24-d: Used Cotton Bale Ties, effective Jan. 1, 1943. Prohibits delivery from plants in cotton states except to persons baling cotton or textile products or to reconditioners.

M-29: Tungsten, effective Aug. 31, 1941, revoking M-3, M-3-a; last amended Feb. 4, 1943. Includes secondary material but excludes secondary chemicals, including pigments. WPB authorization required to deliver tungsten except in any form to MRC; in any form (except in wire, rod, sheet or metal powder) in quantities of 25 lb. or less contained tungsten in any one month; ores and concentrates to any producer for beneficiation or to any dealer who may hold material not longer than 120 days. Exempts tungsten contact points from allocation control. **M-29-b,** effective Feb. 14, 1942, last amended Feb. 9, 1943. Prohibits use of tungsten in grinding wheels, gauges and as coloring material for rubber, linoleum, paper or similar materials. Other users must limit quarterly consumption to 17½% of use in year ended June 30, 1941. Exemptions: Certain government contracts; alloy steels; welding rods, laboratory, electrical radio, X-ray equipment; electronic relays and electric lighting uses if use of less critical materials is impracticable.

M-34: Toluene, effective Aug. 28, 1941. Placed under complete allocation effective Feb. 1, 1942. Amendment May 22, 1942, requires maximum production of toluene by oil processors and coke oven operators.

M-38: Lead, effective Oct. 4, 1941. Lead released by Metals Reserve Co. allocated by WPB. Consumers must file Form PD-68A by the 20th of each month with WPB, applying for allocation in the following month and detailing inventories.

M-38-c: Lead, effective Jan. 10, 1942; last amended Feb. 2, 1943. Bans lead use for following: Automobile body solder; ballast or keels for pleasure boats; blocks for cutting leather; ornamental glass; regalia; badges and emblems; statuary and art goods; tennis court markers; toys, weights for bats, clocks, decoys, dresses, golf clubs, jockey saddles; buttons, costume jewelry, novelties, trophies, foil for cigarette packaging. Exempted are uses in plants where corrosion makes lead imperative; building supplies on critical list for defense housing. Use PD-234 to seek exemptions. Permits manufacture of lead rods used in stained glass windows and, when other material impractical, making of foil for condensers, electrotyping and moulding lead, and dental X-ray equipment and supplies.

M-39: Cobalt, effective Nov. 3, 1941, last amended March 9, 1943. Includes cobalt in all forms. All deliveries, except those to MRC, over 25 lb. in any one month must be authorized by WPB.

M-40: Sperm Oil, effective Oct. 16, 1941; last amended Oct. 27, 1942. Placed under complete allocation May 16, 1942. Banned in making lubricating or cutting oils or compounds, if sulphur content below 10%. Use of 100 lb. or less per month permitted without authorization. Sellers limited to unauthorized delivery of 2000 lb. per month.

M-43: Tin, effective Dec. 18, 1941; last amended Jan. 9, 1943. Revokes M-43-a. All shipments and uses must be authorized by WPB. Prohibits use in List A articles; forbids use in List B items unless specifically authorized by WPB. Restricts use in Schedule I articles. Distributor may deliver less than 3-ton lots but not exceeding 5 tons per month to regular customers, subject to Priorities Regulation No. 1. Imports must be sold to MRC. Use PD-213 to apply for allocation. **M-43-b,** effective Jan. 26, 1943 last amended April 27, 1943. Forbids use of primary tin in repairing gas meters of less than 300 cu. ft. per hour capacity unless meter is inaccurate by more than plus or minus 4%, meter unrepaired internally for 12 years. Tin-bearing material may be used to repair a meter; having opening through which gas escapes in outside case or connections; having functional defect; any meter, if repair material is reclaimed from meters brought in for repair.

M-45: Sheet steel inventory for Steel Drums, effective Nov. 17, 1941, last amended April 8, 1943. Directs reservation by WPB of designated quantity of hot and cold-rolled sheets owned by drum makers for subsequent use in making drums for overseas shipment of various products. PD-155A is authorization to process steel.

M-49: Iridium, effective Dec. 12, 1941. Forbids use of Iridium and alloys in jewelry.

M-50: Jewel Bearings, issued Jan. 14, 1942, last amended Feb. 9, 1943. Provides for complete allocation. Bans use of vee bearings and large ring bearings of sapphire or ruby, with certain exceptions, unless specifically authorized by WPB. Suppliers file PD-235; consumers PD-236; producers PD-338.

M-53: Printing Ink, effective March 30, amended June 29, 1942. Limits use of following to 70% of 1941 rate in making printing inks: Molybdate orange, chrome green, and organic pigments. Use of chrome pigments, iron blue limited to 100% of 1941 rate. Amendment, Aug. 18, lifts restrictions on orange mineral use.

M-54: Molasses, effective Dec. 31, 1941. Restricts monthly deliveries to various types of purchases up to 30 per cent of monthly average receipts in 12 months ended June 30, 1941. Deliveries for foundry purposes limited to 110 per cent of base period rate.

M-57: Tung Oil, effective Jan. 8, 1942. Sales limited to A-2 orders or better, with following exceptions: For food can linings and outside can coatings when necessary: for Defense Supplies Corp.; and to comply with safety and health regulations. Amendment, effective Nov. 1, requires specific authorization for use, except 35 lb. or less per month.

M-58: Glycerine, March 30, 1942; last amended Dec. 10, 1942. Deliveries of more than 50 pounds monthly placed under allocation, except for war orders and health supplies. Use for making anti-freeze banned, other uses limited to 70% of average 1940 rate.

M-59: Palm Oil, effective March 20, 1942; reissued as FDO No. 38, March 24, 1943. Transfers control to Food Distribution Administration. Restricts use, unless specifically authorized, to manufacture of tin plate, terne plate, long ternes, steel sheets, strip and black plate; to manufacturing processes in which glycerine produced, provided remaining glycerine in product not over 1½%; conformance with FDO No. 33. Exempts persons using less than 2000 lbs. per quarter.

M-60: High Lauric Acid Oils, effective March 20, 1942. Prohibits use of oils which do not produce glycerine or in which amount of glycerine remaining exceeds 1½% on anhydrous soap basis.

M-61: Graphite, effective Feb. 17, 1942; last amended Dec. 4, 1942. Prohibits use except with specific authorization of WPB. Prohibits delivery (except by jobber) of any strategic graphite, crucible or other product containing graphite without specific authorization, unless in process prior to Feb. 17, 1942. Orders for armed forces exempted. Buyers seeking delivery of crucibles containing graphite file PD-575 by 20th of month. Crucible producers file PD-303B.

M-62: Sodium Nitrate, effective Jan. 15, 1942. Full allocation starts Feb. 1, 1942.

M-63: Imports of Strategic Materials, effective Dec. 28, 1941; last amended Jan. 18, 1943. Requires imports of specified commodities, including the following, whether in bond or otherwise, to be handled only by Metals Reserve Co. or other government agency unless authorized by WPB. Antimony; aluminum scrap; beryllium salts; chromite; columbite; copper; copper and brass scrap; graphite; kyanite; lead; magnesium; mercury; mercury-bearing ores; rutile; silver; tin; tungsten ore; tantalum ore, vanadium ore; zinc; zirconium ore; iron and steel scrap. Zinc; lead; copper ore and concentrates and metallic mineral substances in crude form and not otherwise classified are excluded. Private importers may apply on PD-222C for permission to purchase for importation. **M-63-c,** effective Dec. 7, bans importation of quartz crystals on existing contracts without express WPB permission.

M-65: Cadmium, effective Jan. 17, 1942. Amended June 24, 1942. Deliveries prohibited unless authorized by WPB for essential military and civilian uses. Order M-65-a, effective Jan. 17, 1942, bans cadmium use after March 31, except for government orders, Lend-Lease, and to comply with safety regulations issued under governmental authority.

M-72: Tin and Lead Scrap, effective Jan. 8, last amended May 18, 1942. Dealers are forbidden to accept deliveries of scrap unless during the preceding 60 days they have disposed of an amount equal to their inventory on date of delivery. Direct allocation by WPB provided, when necessary. Consumers must report by 10th of each month to Bureau of Mines on PD-254A detailing inventory, production, purchases, sales and consumption for preceding month.

M-72-a: Sept. 2, 1942, last amended Oct. 20, 1942, prohibits delivery to or acceptance by a producer of steel or iron of tinned scrap, including terneplate cans. Bans sales of tin plate clippings except to a broker, dealer or to a detinning plant. Tinned scrap must be sold only to brokers and dealers for resale in form received, to detinners, shredding plants, their agents, regular trash collection agencies and copper precipitation plants. Bottlers seeking permission to purchase used cans must apply to WPB on a certificate attached to Order M-72-a. Trash collections agencies in specified districts must collect and keep segregated all prepared cans offered.

M-76: Turbines, effective March 9, 1942. Enables WPB to establish schedules for manufacture of land turbines.

M-78: Mercury, effective Jan. 23, 1942; last amended Aug. 5, 1942. Prohibits use for following: Carroting of hat fur; fireworks and film developing preparations; thermometers (except industrial and scientific); treating of green lumber (except Sitka spruce); turf fungicides; vermillion; wall switches for non-industrial use; wood preservation. Quarterly use for following limited to 1940 period or 1941 first quarter: Fluorescent lamps; health supplies; mercuric fulminate for ammunition; industrial and scientific thermometers. Use of mercuric fulminate for commercial blasting caps limited to 125 per cent of base period. Amount used in production of cosmetics cut from 80 to 30 per cent. Exempts restrictions on deliveries to laboratories for specified purposes: manufacture of anti-fouling paint for merchant vessels; and maintenance and repair of industrial control equipment.

M-79: Asbestos, effective Jan. 20, 1942 amended June 18, 1942. Starting Feb. 1, 1942, processing of various grades of imported fibre prohibited, except to fill certain specified defense orders. Permission of WPB required to install high-temperature pipe covering, except for installations of 212 degrees Fahr. or over. Ship and underground installations exempted from latter. Processors file PD-251 or PD-252 by 10th each month.

M-81: Cans, effective Feb. 11, 1942; last amended April 27, 1943. Limits use of tin plate, terne plate and black plate for packing food and non-food products in cans; specifies the can sizes which may be used for each product; establishes packing quotas for all the items covered. Permits use of "frozen" tinplate under specified conditions.

M-89: Corundum, effective Feb. 7, 1942, last amended Sept. 16, 1942. All deliveries allocated, including ores and superfine flour. Sellers required to file PD-293 with WPB by 10th of each month. Distributors and producers file 293A by 28th; consumers PD-294 by 10th and 294A on application for allocation of superfine flour.

M-95: Rhodium, effective March 11, 1942. Limits use in jewerly plating. Sellers report to WPB on PD-295 by 10th. Amendment April 17, 1942, bans all use of rhodium in jewelry manufacture.

M-97: Coal and Coke, effective Feb. 13, 1942. Permits users to acquire inventories exceeding limitations of Priorities Regulation No. 1.

M-99: Printing Plates, effective Oct. 1, 1942; last amended Nov. 15, 1942. Bans owners of obsolete plates from acquiring any new metal after Oct. 1. Sets up table of time limits for obsolescence. Copper engravings may be sold to authorized electrotypers. Zinc and other metal plates may be sold through customary scrap channels or to authorized smelters and refiners. Electrotypes may be sold to Essex Alloy Co. Inc., National Lead Co., Metro Smelting Co.

M-100: Rationing of Trucks, Truck-Tractors, Trailers, effective March 9, 1942. Application forms and instructions available at truck sales agencies. Applicants approved by WPB and ODT receive Certificate of Transfer, permitting purchase.

M-101: Mica, effective March 6, 1942; last amended Dec. 10, 1942. Prohibits processing of domestic mica unless authorized by WPB. Forbids delivery of unfabricated mica, except to Colonial Mica Corp. unless with specific WPB authorization. PD-480 must be filed jointly by consumer and fabricator. Processors report to WPB on PD-325 by 15th of month.

M-104: Closures for Glass Containers, effective April 3, 1942; last amended March 15, 1943. Prohibits use of closures made of tin plate, terne plate, blackplate, wire, rubber for following: protective cover caps; double shell or semi-double shell caps; two piece closures, except for home-canning purposes. Prohibits use of tin plate, terne plate or black plate, except "rejects" or electrolytic waste-waste", in excess of 90 lb. per base box for manufacture of crown caps. Prohibits use of tin plate with tin coating in excess of 1.25 lb. per base box. Allows canners and bottlers to accept 5000 closures a year without restriction if they used less than that number in 1942. Orders placed by armed forces Lend-Lease, and other specified government agencies exempted. Restrictions do not apply for any product not specified by the amendment if closures on Dec. 23 were manufactured, or if materials had been fully lithographed with user's private design cut into strips. Sets up quotas for use in packing various products.

M-106: Shellac, effective April 14, 1942, last amended April 8, 1943. Requires specific WPB authorization for use, processing and delivery, except certain stocks in inventory on Feb. 25, 1943. Consumers and suppliers file PD-617 by 15th of month; report inventories of 5000 lb. or more on PD-334 by 15th of each month.

M-109: Rough Diamonds. March 27, 1942; last amended Nov. 11, 1942. Sales and imports of more than 5 carats must be reported within 10 days on PD-377; smaller sales reported monthly on PD-378; quarterly

report on stocks must be made on PD-376. Does not cover cut or polished gems nor rough diamonds in a tool in use. Diamonds in unused tools must be reported. No rough diamonds not incorporated in tools and other devices can be sold, or delivered unless they fill an order rated A-1-j or higher, or aggregate weight is 50 carats or less of crushing bortz or 5 carats or less of rough diamonds to one customer in one month, or WPB has specifically authorized the transfer.

M-110: Molybdenum, issued March 18, 1942, effective May 1. Covers all forms, including scrap. Provides for complete allocation. PD-360 filed with WPB and supplier to request delivery. Buyers of less than 50 pounds per month do not file. Amendment, Aug. 8, requires WPB approval of melting schedules. M-110-a, Nov. 6, 1942, permits deliveries under certain conditions up to 500 lb. of contained molybdenum in any one month without applying for an allocation. Melters, other than steel product producers, may use up to 500 lb. monthly without submitting schedules to WPB.

M-112: Antimony, March 30, 1942, last amended March 8, 1943. Allocation applies to monthly deliveries of more than 2240 lb. of contained antimony. Restricts use in inorganic pigments for non-ceramic coatings to 2% and bans use for toys and decorative objects. Consumers file PD-380 with WPB by 20th of month.

M-113: Canners' and Canmakers' Boxes, effective March 23, 1942. Permits accumulation of excess inventories by box users.

M-115: Collapsible Tin Tubes, effective April 1, 1942, last amended April 23, 1943. Bans production of tubes containing more than 7½% tin, except for certain pharmaceutical preparations. Permits use of tubes containing 3% tin for tooth pastes but limits pack to 75% of 1942 total but in addition allows production for Red Cross. Prohibits use of tin for shaving cream tubes but permits manufacturers to use tube blanks containing up to 1½% tin which they had in inventory Jan. 13, 1943. Retail buyers must turn in used tube for each new one bought except for delivery to member of armed forces or by Red Cross. Used tubes disposed of to Tin Salvage Institute, Newark, or other MRC agents.

M-119: Rubber Sealed Closures, April 9, 1942; revoked March 30, 1943.

M-123: Asbestos Textiles, effective March 30, 1942. Last amended Dec. 14, 1942. Prohibits use to make items on List A, except products in process on Dec. 14 to be completed by Feb. 1, 1943. Limits grade used to make laminated plastics and mechanical packing or gasket material.

M-126: Iron and Steel Use, effective May 5, 1942; last amended Dec. 17, 1942. Prohibits iron, steel use to manufacture specified items and receipt of iron and steel for that purpose. Does not include nails and other joining hardware. Certain exemptions made for Army-Navy-Maritime orders and for manufacture of roofing and siding. Use of stainless steel prohibited except as specifically authorized by WPB. Appeals filed on PD-500 with WPB field offices.

M-128: Zinc Sulphide Pigments, effective May 5, 1942. Requires manufacturers to set aside certain percentage of production for allocation in following month.

M-137: Benzene, effective April 20, amended June 1, 1942. Provides for complete allocation. Use as motor fuel prohibited.

M-143: Indian Kyanite, effective May 6, 1942. Includes andalusite and sillimanite. Provides complete allocation. Suppliers and users of kyanite to make refractories file PD-466 by 10th each month with WPB.

M-148: Exports of Critical Material, effective May 13, 1942; last amended April 19, 1943. Gives preference to exports to other American republics, within limitations of specific allocations by Requirements Committee of WPB, over other orders for such materials to extent necessary to meet delivery schedules set by BEW and WPB. Exports are subject to assignment of preference ratings. Rated orders must be endorsed with prescribed form of certification.

M-150: Aromatic Petroleum Solvents, effective May 26, 1942. Limits deliveries to ratings of A-2 or better. Requires pool accumulation by producers for distribution by WPB and diversion of remaining output to production of nitration toluol or aviation gasoline. Amendment, July 11, extends restrictions to xylol.

M-152: Arsenic, effective May 22, last amended Oct. 21, 1942. Use prohibited except as specifically authorized after filing PD-600.

M-154: Thermoplastics, issued June 27, 1942; last amended March 26, 1943. Bans use for making specified products except for war purposes. M-154-b, revoked Dec. 22, 1942.

M-156: Tantalum, effective May 22. Allocates supplies monthly. Users file PD-487 and 488 by 20th, processors PD-489 by 27th.

M-160: Beryllium, effective June 1, 1942. Provides for complete allocation.

M-161: Inventory Restrictions, effective June 1, 1942 last amended Jan. 15, 1943. Lifts restrictions on stocks of materials for manufacture of refractory brick, waste paper, ilmenite, caustic soda, soda ash and other specified products.

M-162: Platinum, effective May 30, 1942; last amended Nov. 2, 1942. Limits sales and purchases to refiners, dealers, distributors, processors, consumers. Bans use in manufacture of jewelry. By 15th each month stocks must be reported on PD-512; sales on PD-513; purchases on PD-514.

M-175: Ethyl Cellulose, effective June 18, 1942. Provides complete allocation. Deliveries of 50 lbs. at one time in one month do not require specific authorization by WPB.

M-181: Small Diamond Dies, effective July 1, 1942. Places dies having diameter of 0.0015-inch or less under complete allocation. Suppliers file PD-559, consumers PD-560, with WPB by 20th each month.

M-183: Phosphate Plasticizers, Aug. 1, 1942. Provides for complete allocation.

M-184: Aniline, effective July 13, 1942. Consumers seeking delivery of 500 lbs. or more monthly file PD-583 by 10th.

M-190: Calcium Carbide, effective Dec. 9, 1942. Prohibits delivery without specific authorization, except: monthly shipments of 10 tons or less; for resale for house or mine lighting.

M-191: Lithium Compounds, effective July 16, 1942. Provides for complete allocation. Deliveries of 25 lbs. or less in any month are exempted.

M-195: Cryolite, effective Oct. 1, 1942. Requires WPB authorization for delivery, receipt or use, except receipt and use as insecticide.

M-199: Silver, effective Oct. 1, 1942, last amended Feb. 25, 1943. Bans use of foreign silver in non-essential products, except to fill A-1-a or higher orders. Restricts use of domestic silver for non-essential products to 50% of 1941 or 1942 use, except by firms unable to convert to war work and not employing over five; by hand-tool jewelry manufacturers.

M-200: Milk Shipping Containers, effective Oct. 1, 1942; last amended Jan. 15, 1943. Prohibits manufacture of milk cans except those complying with specified limitations and specifications. Use of iron and steel in year ending June 30, 1943, limited to 65 per cent of amount used in previous like period.

M-211: Heat Treating Equipment, effective Aug. 22, 1942. Authorizes WPB to establish production and delivery schedules in such instances as may be necessary.

M-212: Petroleum Coke, effective Oct. 10, 1942; last amended March 15, 1943. Limits delivery and use, subject to specific exceptions. Prohibits exports except to Canada without WPB authorization.

M-215: Glycols, effective Oct. 1, 1942. Forbids any person to deliver or use glycols without specific WPB authorization.

M-225: Overhead Traveling Cranes, effective Sept. 8, 1942. Permits WPB to establish production and delivery schedules which shall be maintained without regard to any preference ratings already assigned or subsequently assigned.

M-227: Copper Chemicals, effective Oct. 1, 1942; last amended April 6, 1943. Prohibits delivery or use of copper sulphate, carbonate, chloride, oxide, nitrate and cyanide without specific authorization, except for soil treatment, insecticides and fungicides. Small certified orders of 1500 lb. or less in any quarter of copper sulphate or of 300 lb. or less of copper carbonate, chloride, oxide, nitrate or cyanide are exempt under specific conditions. Restricts use in plating as provided under M-9-c. Purchasers file PD-600; suppliers PD-601.

M-235: Castor Oil, effective Sept. 25, 1942. Limits use and processing. PD-600 is application for allocation.

M-238: Oiticia Oil, effective Oct. 6, 1942. Bans use after Nov. 1, 1942, except as authorized or for 35 lb. or less per month.

M-239: Steatite Talc, effective Oct. 13, 1942; last amended Feb. 6, 1943. Forbids use, sale, delivery for any purpose except for insulators in communications, radio, radar, and underwater sound instruments; in electrical and heat insulating products (not including refractories); electric light bulbs; experimental work; spark plugs for certain war agencies or for delivery in accordance with L-158; filtering of foods, flavoring extracts, medicines; medicines and health supplies. Inventories limited to 6 months' supply. Producers must file PD-678; suppliers PD-679 by 10th of each month.

M-242: Sulfamic Acid, effective Oct. 3, 1942; last amended Dec. 12, 1942. Bans delivery and use after Nov. 1, 1942, except as authorized or for 5 lb. or less per month. Users file PD-600.

M-244: Carbon Black, effective Nov. 1, 1942. Provides complete allocation.

M-253: Lithium Ores, effective Dec. 5, 1942. Requires specific authorization of WPB for delivery or use. Suppliers must file PD-728 and consumers must file PD-729 by 15th of each month.

M-255: Steel Drums, effective Nov. 16, 1942; last amended March 29, 1943. Provides complete allocation. Prohibits sales and deliveries of new steel drums and parts (excepting flanges, plugs, cap seals) without specific authorization obtained by filing PD-835.

M-257: Sulphuric Acid, effective Dec. 5. Provides allocation control. WPB will issue directions when and as needed. Producers of sulphuric and all who deliver spent sulphuric acid file PD-601 by 10th of each month.

M-260: Acrylic Resins, effective Jan. 1, 1943. Controls use of acrylic monomers and acrylic resins.

M-261: Strapping for Shipping Containers, effective Jan. 25, 1943; last amended Feb. 4, 1943. Prohibits use of strapping unless: weight of container and contents exceeds 90 lb.; net weight of contents exceeds 0.058 lb. per cubic inch; use is required by Interstate Commerce Commission; specified by Army, Navy, Maritime Commission, War Shipping Administration; for export outside both United States and Canada; for wooden shipping containers for specified edibles; for wooden lard or butter tubs, buckets or pails; for closing fibre drums or hexagonal or octagonal fibre containers; on specified types of light bundles.

M-276: Bismuth, effective Jan. 19, 1943. Prohibits delivery after Feb. 1 without specific authorization by WPB except: to MRC, to other producers, to a distributor, to a person whose total receipts during that month total less than 50 lb. Use of metal in consumers' inventories limited to 50 lb. per month without specific WPB authorization. Apply on PD-776.

M-280: Copper Rollers, effective Feb. 15, 1943. Prohibits use of copper textile print rollers which were idle in the hands of producers from Sept. 1, 1941, to Sept. 1, 1942. Such rollers must be sold either to a brass mill or to MRC. As alternate, producers may set aside an equivalent amount of other copper rollers, if they find they want to use the idle rollers at some future date. Freezes all rollers held by dealers and permits their sale only to brass mills or MRC.

M-285: Uranium, effective Jan. 26, 1943. Bans sale or delivery of uranium and its compounds for use in glass, pottery, tile and other ceramic products.

M-287: Anhydrous Aluminum Chloride, effective March 15, 1943. Prohibits delivery or use except as specifically authorized by WPB. Application for authorization to accept or deliver anhydrous aluminum chloride in any month beginning with April must be filed on or before 15th of the preceding month.

M-292: Coke, effective March 12, 1943. Requires producers to file monthly production, distribution and inventory reports with Bureau of Mines on forms BE and BY of the Bureau.

M-293: Critical Common Components, effective Feb. 26, 1943; last amended March 31, 1943. Formalizes existing scheduling practices and provides regular procedures for future contingencies. Provides specific regulation covering manufacture and distribution of critical components, such as valves, pumps, fittings and bearings.

M-296: Ferrocolumbium, effective March 25, 1943. Permits use or delivery only with approval of WPB. Application for such approval must be made on forms PD-391 or PD-707. Applicants must report also on PD-805. Covers any alloy containing 45 per cent or more by weight of columbium.

M-302: Osmium, effective March 16, 1943; last amended April 16, 1943. Bans use for all purposes except manufacture of alloys for implements of war. Restricts use of osmium alloys, made prior to April 16, exclusive of use for implements of war, to 50% of 1941 rate. Alloys made after April 16 must be used for implements of war. All suppliers and consumers must file PD-846 by 15th of each month.

M-303: Calcium Metal, effective April 1, 1943. Places under allocation products containing the element calcium not in chemical combination and in which any metallic constituents other than calcium do not constitute more than 15% by weight. Application for authorization to use or accept delivery of calcium metal must be filed on form PD-600 with WPB and supplier by 15th of preceding month. Application for authorization to make delivery must be filed by producer or distributor with WPB on form PD-601 by 20th of month.

"P" Orders

(See P-90: Production Requirements Plan. Ratings assigned by following "P" Orders not applicable to companies required to operate under PRP, as provided by Priorities Regulation No. 11.)

P-14-a-b: Material and Equipment Entering Construction of **Ship Ways,** effective July 12, 1941, rating A-1-a (1941), A-1-b (1942-43).

P-19-e: Road Projects, effective Oct. 18, 1941, rating as assigned. Amendment, effective March 6, 1942, eliminates extension of ratings to purchase road building machinery and equipment. May be used for repair parts needed to prevent work stoppage, perishable tools, temporary work.

P-19-h: Rated Projects, effective when issued, rating as assigned to builders for delivery of material entering into construction of various projects, tools, machinery or equipment to be located and used in the project. Covers certain "expendible materials" consumed during construction. Assigns blanket rating of AA-3 to deliveries of materials for use in construction of most projects programmed by National Housing Agency.

P-19-i: Aluminum, Magnesium Plants, effective May 6, 1942; last amended Sept. 17, 1942. Rating as assigned on delivery of material for plant construction.

P-19-j: Construction, issued Jan. 11, 1943. Rerates AA-4 orders in P-19 series to AA-3, except those issued to Federal Public Housing Authority.

P-19-k: Construction, issued Jan. 11, 1943. Assigns AA-3 rating to deliveries if previously assigned rating under P-55 or by issuance to FPHA of rating order P-19-d or P-19-h.

P-29: Health Supplies Rating Plan, effective Aug. 25, 1941, rating A-10. Amendment, Feb. 14, 1942, substitutes endorsement on purchase orders for furnishing copies of P-29 to extend rating.

P-43: Laboratory Supplies, Equipment, effective Aug. 28, 1941; revised Nov. 5, 1942. Assigns rating of AA-2X for purchase of equipment, reagent chemicals and other materials by production control and research laboratories. Specific WPB authorization required to apply rating for material costing more than $50, except reagent chemicals. Apply for authorization on PD-620. Holders of serial numbers must file PD-93 by 15th of each month. (See P-135).

P-47: Material Entering into the Maintenance and Repair of **Air Transportation Facilities,** effective Sept. 6, 1941, rating raised to AA-1 Oct. 2, 1942. Use PD-96.

P-55: Defense Housing Projects, effective when issued. Applies rating as determined by WPB to certain authorized materials required in connection with privately financed defense housing projects. Assigns blanket rating of AA-3 to deliveries of materials for use in construction of most projects programmed by National Housing Agency. Application for rating to be filed on Form PD-105. Provides that suppliers who process material extensively should apply for assistance under P-90 on PD-25A.

P-55-b, issued March 31, 1943, authorizes start of construction provided only those materials are used which have been approved on materials list of PD-105-A: Consumers must also file PD-105 with WPB and CMP-H-1 with National Housing Agency.

P-56: Mines, effective Sept. 22, 1941, last amended March 11, 1943. Provides for assignment of serial numbers to mines and smelters engaged in essential war production. Producers apply for MRO supplies on form in PD-400 series; for capital equipment on written application. Assigns blanket rating of A-2 to MRO supplies for producers not holding serial number. Inventories of operating supplies in relation to production must not exceed average ratio of 1938-39-40. Prohibits disposal by resale of Material or equipment obtained under P-56 except (1) to another serial numbered producer or (2) with approval of Mining Equipment Division, WPB. Inventories of operating supplies in relation to production must not exceed average ratio of 1938, 1939, 1940.

P-58: Supplies for South American mines, effective Oct. 8, 1941; last amended April 6, 1943. Cerro de Pasco Copper Corp., Andes Copper Mining Co., Chile Exploration Co., Braden Copper Co. must apply on PD-803 for priorities assistance to obtain MRO supplies; must submit written application to WPB for other equipment. Prohibits purchases under CMP Reg. No. 5. Ratio of inventory to volume of current output must not exceed ratio of average inventory to average output for years 1938, 1939, 1940.

P-65: Marine Paints, effective Dec. 5, 1942, last amended April 10, 1943. Assigns AA-1 rating for materials to be incorporated into paints for listed claimant agencies.

P-68: Steel Plant Maintenance, Oct. 31, 1941, last amended Jan. 19, 1943. Assigns AA-1 rating for purchase of operating, repair and maintenance materials. Deliveries not permitted if inventories exceed 125 per cent of dollar volume on last day of preceding calendar half-year. Quarterly withdrawals from inventory must not exceed 35% of volume in preceding six months. PD-148 used to apply for rating. PD-228 filed quarterly with WPB.

P-73: Smelters, Refiners of Copper, Lead, Zinc, Antimony, Mercury, Cobalt, Iridium, Tin, Molybdenum, Nickel, Platinum, Tungsten, Vanadium, issued Dec. 22, 1941 last amended March 24, 1943. Producers with serial numbers file PD-760 for priority assistance for MRO supplies; make written application for other equipment. CMP Regulation No. 5 not applicable. Prohibits resale of material acquired under P-73 except to another smelter or refiner or with approval of Mining Equipment Division.

P-84: Plumbing, Heating Repairs, effective March 13, 1942. Assigns A-10 rating to materials for emergency repairs. Does not apply to copper parts or scarce materials for which substitutes available; or to materials subject to OPA ration order.

P-88: Railroad Material, effective March 17, 1942; revoked April 5, 1943. Superseded by P-142.

P-89: Chemical Plants, effective Jan. 23, 1942; last amended April 24, 1943. Assigns for second quarter AA-1 rating and allotment symbol MRO-P-89 for MRO supplies not exceeding $500 for any unit and not exceeding 100 lb. of aluminum constituting a controlled material. Orders for MRO supplies must carry prescribed certification. Inventories must be kept at minimum practicable working inventory. Higher emergency ratings granted upon request. Ratings may be used only after filing PD-762 with Chemicals Division, WPB; for third quarter by May 15; for subsequent quarters, 45 days before start of period. Application must be made for special preference rating to buy metal containers.

P-90: Production Requirements Plan, issued Dec. 3, 1941, displaced by Priorities Regulation No. 11.

P-98-b: Petroleum Industry Materials, effective Sept. 15, 1942; last amended Jan. 29, 1943. Supplants P-98. Assigns A-2, A-1-a or AA-2X ratings to all materials used in production branch, and to those used for maintenance, repair and operating supplies in other branches; AA-1 for emergency repair. P-98-c, effective Jan. 2, 1943; last amended March 24, 1943. Permits sale of inventory stocks by oil operator to an oil industry supplier for direct resale to another operator. File PD-470 and PD-311 or 311C; conform with provisions of Priorities Reg. No. 9 if material is to be used outside U. S. Restricts inventories to 90-days' needs. Operators must have serial number assigned under PAW-Materials Redistribution Program No. 2.

P-100: Repairs, Maintenance, Supplies, effective Dec. 18, 1941; revoked April 2, 1943. Serial-numbered copies of P-100 issued to Canadian producer remain in effect until specifically revoked or producer becomes eligible to apply ratings assigned under CMP No. 5.

P-101: Bookbinding Wire, effective Jan. 24, 1942. Assigns A-8 rating to materials for manufacture of flat steel wire used for binding processes in printing and publishing industries, excluding pre-formed staple, box stay and specialty binding wire. Used only for materials authorized by WPB which determines requirements on quarterly basis.

P-115: Canning Plant Maintenance and Expansion, effective Feb. 11, 1942; amended Feb. 8, 1943. Assigns AA-1 rating to plants canning or processing fruits, vegetables or fish for repair and maintenance; AA-2X for material required for operation; AA-3 for material required for replacement. Excludes all new buildings and new production lines.

P-118: Dairy Machinery, effective April 13, 1942; last amended Feb. 5, 1943. Assigns AA-1 rating for material required for maintenance or repair; AA-2X for operation; AA-3 for replacement of dairy or egg processing equipment. Processors must file PD-414 quarterly and to apply for use of AA-3 rating.

P-120: Aluminum, Magnesium Plants, issued March 20, 1942; revoked April 1, 1943. MRO supplies obtained under CMP Regulation No. 5.

P-122: Aircraft, effective March 9, 1942. Raises to A-1-a or A-1-b all ratings previously assigned by preference rating certificates PD-1, PD-1A, PD-3, PD-3A or PD-5 for military and naval aircraft. A-1-a applies to tactical planes, A-1-b to trainers.

P-126: Refrigeration, Air-conditioning Equipment, effective April 20, 1942; last amended Feb. 6, 1943. Assigns ratings for replacement parts needed by users in 1st class AA-2X; 2nd class AA-3; 3rd class AA-4. Comfort cooling systems not covered by any ratings. Old part must be turned in immediately upon installation of new part. Domestic refrigerators exempted.

P-130: Communications, effective April 23, 1942; revoked April 1, 1943. Superseded by order U-3.

P-131: Officers Uniforms, effective June 3, 1942. Assigns A-1-i rating. Ratings for metal buttons and closures obtained under PRP.

P-132: Communications, effective Oct. 19, 1942; revoked April 1, 1943. Superseded by order U-3.

P-133: Electronic Equipment, effective Oct. 5, 1942; last amended Feb. 4, 1943. Assigns AA-2X rating to materials for operating, maintenance, repair supplies for operators and suppliers, subject to specific restrictions.

P-134: Copper, Zinc Mills, effective Dec. 31, 1942, revoked April 15, 1943.

P-135: Reagent Chemicals, Nov. 5, 1942. Assigns rating of AA-2X to deliveries of reagent chemicals and laboratory equipment for use by any laboratory for analytical, testing control, educational or research purposes. Rating may be applied without prior granting of a serial number as under P-43. Purchases with AA-2X rating may not exceed in any quarter buyer's average quarterly purchases in year ended Sept. 30, 1942.

P-136: Metal Scrap Processors, effective Nov. 6, 1942; last amended Jan. 13, 1943. Assigns following ratings: AA-2X for essential repair materials and parts to remedy breakdown or suspension of operations; AA-3 for repair materials and parts to avert breakdown; A-1-a for repair materials, spare parts and operating supplies to a total value up to $500 per quarter. Covers Canadian scrap dealers.

P-141: Public Sanitation Services, effective Feb. 27, 1943. Assigns following ratings: AA-2X for maintenance and repair mate-

rials and operating supplies; AA-1 for repair of actual breakdown; AA-5 for protection against hostile acts, if authorized by federal or state agency.

P-142: Transportation System Material, effective April 5, 1943; last amended April 14, 1942. Supersedes CMP Regulation No. 5 insofar as larger systems are concerned. Covers steam, electric and terminal railroads, private car line companies, electric street railway and trolley coach systems, common carrier passenger motor bus systems, except those which can obtain all of the controlled material needs at retail or from warehouses. Requires filing of quarterly requirements on PD-844, including controlled materials, with WPB which will assign preference ratings. Certification MRO-P-142 and serial number must be used in applying preference rating and in obtaining controlled materials; certification with symbol MRO-P-88 plus serial number under P-88 may be used temporarily. PD-331 may be used during second quarter. Liberalizes former resale provisions. Restricts inventories to 60 days' requirements.

P-144: Farmstead Wiring, effective April 10, 1943. Assigns rating of AA-3 to farmers, eligible for electric utility connections under order U-1-c and so certified by USDA County War Board, for purchase up to 75 lb. of wire plus necessary accessories.

"U" Orders

U-1: Utilities, effective Feb. 24, 1943; last amended April 17, 1943. Governs flow of materials into entire utilities field with exception of communications. Requires utilities to sell surplus stocks. Authorize use of AA-1 rating for maintenance, repair and minor construction, except to obtain scarce materials which could be replaced by less scarce material; to obtain materials which could be obtained without rating; or to obtain specified materials.

U-1-a, effective Feb. 24, 1943. Permits service connections to facilities of Army, Navy, Maritime Commission up to 250 feet for main extension. Cost limited to $1500 for underground and $500 for other construction.

U-1-b, effective Feb. 24, 1943. Permits service connections for operation of gas or electric range in dwelling, limiting use of material to: 15 pounds of copper for electric range; 75 feet of 1¼ inch steel pipe or 170 pounds of any length of pipe.

U-1-c, effective Feb. 24, 1943. Restricts electric service connections to permit operation of farm production equipment.

U-1-d, effective March 10, 1943. Grants advance approval of limited utility connections for construction or remodeling projects permitted under L-41. To qualify for such automatic approval, material for an electric, gas or water connection must cost less than $1500 in case of underground connection or $500 in case of other connections. Limits use of copper to 60 pounds in an electrical connection or 250 pounds of iron and steel for gas or water service for an industrial or commercial consumer; restricts use of material for domestic consumer projects to limits established by the Housing Utility Standards issued by WPB.

U-1-e, effective March 31, 1943. Authorizes water line extensions for watering gardens: 50 ft. for 5000 sq. ft. and additional 5 ft. up to total of 250 ft. for each additional 500 sq. ft. of garden space.

U-3: Telephone Equipment, effective April 1, 1943. Replaces order P-130. Assigns rating of AA-1 for purchase of MRO supplies, other than controlled materials which may be bought by using symbol MRO-U and specified certification. Use this symbol and certification also for new construction on war projects. Rating assigned to the project may be extended to communications supplies.

U-4: Telegraph Equipment, effective April 1, 1943. Replaces order P-132. Assigns AA-1 rating for purchase of MRO supplies, other than controlled materials. Prohibits use of CMP allotment symbol for construction on war projects.

U-5: Wire Communications Equipment, effective April 1, 1943. Supersedes order L-148. Limits transfer of equipment, either telegraph or telephone, to ratings of AA-4 or higher, except for previously accepted orders.

Priorities Regulations

Priorities Regulation No. 1, effective Aug. 27, 1941, last amended Dec. 29, 1942. Defense orders must be accepted unless impossible because of previous defense orders, or if buyer will not conform to established prices, or if orders specify delivery within 15 days and such delivery would require termination before completion of an existing production schedule. Delivery under defense orders must be made before other orders, but no earlier delivery date shall be specified in any defense order than required by the schedule of the person placing the order. Material obtained under allocation or preference rating may be used under certain conditions to fill orders bearing AA-5 rating or higher; or rating as high as that upon which material was obtained. Inventories must not be increased beyond current needs. Records must be kept for not less than two years of inventories of material covered by preference orders and details of all transactions in such materials. Records are subject to inspection by WPB. Delivery preference given on orders of same rating to first order received, if necessary to meet specified delivery, even though earlier delivery specified on second order. Places AA-1 and AA-2 ratings at same level, replaces latter by AA-2X. Forbids shipments of fluorspar to persons appearing on Restricted Shipping Lists.

Priorities Regulation No. 2, effective Sept. 9, 1941. Makes all preference ratings mandatory and legally enforceable. Validates rating assignments when stamped by Priorities Director on face of application.

Priorities Regulation No. 3, effective Feb. 2, 1942, last amended March 9, 1943. Permits application or extension of any preference rating by use of following certification: "The undersigned purchaser hereby represents to the seller and to the War Production Board that he is entitled to apply or extend the preference ratings indicated opposite the items shown on this purchase order, and that such application or extension is in accordance with Priorities Regulation No. 3 as amended, with the terms of which the undersigned is familiar." Telegraphic orders must include following certification: "Ratings certified". Written description of materials purchased must be sent to supplier within 15 days of orders placed by telephone. Provides that maintenance, repair and operating supplies should be procured as provided in CMP-5.

Priorities Regulation No. 4, effective Jan. 26, 1942. Validates all preference rating certificates issued by WPB.

Priorities Regulation No. 5, effective Feb. 5 1942. Reproduction of all priority forms and orders permitted, with following exceptions: PD-3A, P-25-a through P-25-e, P-26-a through P-26-e, and P-35 may be reproduced only for purposes of information and marked "Specimen Copy" P-3, P-4, P-9-a through P-9-g, P-13, P-15, and P-52 may be reproduced only by or for producers (not suppliers) operating under said orders. Reproduction of P-41 limited to persons entitled to apply the rating.

Priorities Regulation No. 6, effective Feb. 11, 1942. Abolishes Priorities Critical List of Army and Navy Munitions Board as limitation upon application of ratings assigned by various preference orders.

Priorities Regulation No. 7, Feb. 17, 1942. Permits use of facsimile signature when assignment or extension of preference ratings requires endorsement of purchase orders.

Priorities Regulation No. 8, March 16, 1942; last amended April 3, 1943. Discontinue reports on various PD forms.

Priorities Regulation No. 9, effective April 25, 1942. Governs issuance and use of ratings for exports. Ratings assigned may not be applied without export license or other authorization to export, PD-1A used to apply for ratings until new form approved for each type of export product.

Priorities Regulation No. 10, issued June 1, 1942. Revoked Nov. 6, 1942. Copper Branch still requires "end use" information from brass mills, copper wire mills and copper foundries before making allocations.

Priorities Regulation No. 11, issued June 10, 1942, last amended Feb. 22, 1943. Requires adoption of PRP (see P-90) by all companies, or divisions of a company maintaining separate inventories whose past or anticipated quarterly withdrawals from inventory of specified metals aggregate $5000 or more.

Excepted are: Government agencies (not including those engaged in manufacture, such as shipyards, prison factories, etc., which are subject to the requirements); companies or persons engaged in: public utility service, mining or quarrying, petroleum industry, communications, non-manufacturing or non-processing of materials, processing ores or scrap into raw metal, construction.

Metal mills buying not more than $5000 worth of metal quarterly for maintenance, repair or operating supplies are exempt.

Pending receipt of authorization, applicants may apply or extend ratings to 40% during first month of quarter and 70% during entire quarter of anticipated quarterly requirements. Exemption, Aug. 20, allows PRP unit to accept delivery of any material not included on Materials List No. 1 of fourth quarter PD-25A, or of any material exempted from inventory restrictions by order M-161. PRP units may extend ratings served on them (including certain AAA's), instead of authorized ratings to obtain materials not in materials list. Requires PRP units to reduce and rerate outstanding orders to amounts and ratings authorized, within 7 days after receipt of quarterly certificates.

Priorities Regulation No. 11A, issued Jan. 30, 1943; last amended April 1, 1943. Permits PRP units which purchase only fabricated items or materials other than those listed in Regulation No. 11 and which do not process these materials to apply during second quarter ratings authorized by first quarter PD-25A and PD-25F certificates to the same quantities of fabricated items and unlisted materials.

Priorities Regulation No. 12, issued June 26, 1942. Provides for rerating war orders, and application of new series of ratings—AAA, AA-1, AA-2, etc.,—all of which take preference over A-1-a. AA rating abolished, all such ratings being changed to AA-2. PD-4X is form used by government agency to rerate deliveries of war materials to be made directly to it; PD-4Y is Rerating Certificate used by manufacturer to rerate deliveries to be made to him, after his deliveries are rerated by war agency. Amendment, Aug. 10, permits rerating extension for small amounts of operating supplies.

Priorities Regulation No. 13, effective July 7, 1942; last amended April 7, 1943. Provides uniform rules governing sales of idle or excess materials including distress and liquidation sales. Sales from reported inventories must be reported to WPB and Copper Recovery Corp., for copper; WPB, care of Steel Recovery Corp., Pittsburgh for steel.

Priorities Regulation No. 14, effective July 8, 1942. Provides that when Army, Navy and Maritime Commission are excepted from restrictions of limitation and conservation orders, exception also applies to corresponding Canadian agencies.

Priorities Regulation No. 15, issued Oct. 10, 1942. Frees all exports, including Lend-Lease shipments and unrated orders, as well as those assigned ratings by BEW, from end-use and inventory restrictions in foreign countries. Manufacture in this country remains subject to WPB regulations.

Priorities Regulation No. 16, issued Oct. 15, 1942; last amended Feb. 20, 1943. Requires manufacturers to file appeals on form PD-500 in WPB's field offices for relief from restrictions imposed by following orders: L-13-a, L-18-b, L-18-c, L-21, L-21-a, L-22-a, L-23-c, L-27, L-27-a, L-29, L-30-a, L-30-b, L-30-c, L-30-d, L-33, L-36, L-42, L-49, L-59-b, L-62, L-64, L-64-a, L-73, L-74, L-77, L-79, L-80, L-81, L-92, L-93, L-98, L-104, L-135, L-136, L-142, L-150, L-150-a, L-150-b, L-152, L-157, L-161, L-165, L-173, L-179, L-182, L-185, L-187, L-199, L-205, L-218, L-225, L-229, L-236, L-248, L-277, M-11-b, M-83, M-122, M-126, M-177, M-208, M-209, M-248.

Priorities Regulation No. 17, issued Nov. 26, 1942. Restricts Post Exchanges of Army and Marine Corps and Ship's Service Departments of Navy in use of A-10 preference rating to purchase orders for items listed in Munitions Boards Priorities-Allocations Instructions No. 12.

Price Schedules and Regulations

Issued by the Office of Price Administration
Federal Office Building, Second and "D" Streets, Washington, D. C.
Telephone Republic 7500

General Maximum Price Regulations, issued April 28, 1942, as amended and supplemented, sets ceiling prices with few exceptions for commodities and services, not covered by separate schedule, at highest levels charged during March, 1942. Exemptions include waste materials up to level of industrial consumer; zinc, lead and tin industrial residues; antimony ore, concentrates, and wastes; certain machines and parts; ethyl alcohol used in making synthetic rubber; waste materials in wood distillation; sales of armament to the government; certain goods produced under government contracts; items required in an emergency; Brazilian rock quartz crystals; all imported metalliferous ores and concentrates; imported and domestic blister coppers, lead bullion; fluorspar ores; gilding metal clad steel scrap; 40% manganese ore; copper lead, zinc ores and concentrates and services needed to extract these metals from ores. Various supplementary orders fix maximum prices for: nickel anodes sold by platers to MRC and for same material when sold by MRC for nickel plating purposes; used gas cylinders; Indian mica splitting sold to consumers by MRC; nonstrategic domestic mica sold by MRC; calcium carbide drums; and aluminum sold in pig form. Amendments authorize maximum price of 45c for Treasury sales of "silver ordinary"; base price of 45c for domestically-refined silver made from foreign ores; and permit suppliers of semi-fabricated products and sellers of rolled gold plate or gold-filled stock to add 36.125c per fine ounce of domestic silver contained to maximum prices for identical articles made of foreign silver; permit sellers of tin base, lead base or tin-lead base solders to add to maximums 9.634c per troy ounce of silver contained; permit certain additions to silver salts prices. Special pricing formulae are provided for malleable iron castings; high-alloy steel castings; die castings; silico-manganese; certain carriers, storage, or terminal services; certain obsolete electrotype plates; used tin cans of size No. 10 or larger; newly-developed products, nonferrous mill products and fabricated structural steel shapes, plates and bars when such prices cannot be established under section 2 of the Regulation; substandard ferro-manganese; plastic screening. Three per cent property transportation tax cannot be passed on in the form of increased prices.

No. 1—Second-hand machine tools issued Feb. 17, 1941, effective March 1, 1941; last amended April 5, 1943. Maximum prices in terms of percentage of March, 1941 equivalent of new tools: Constructed before Jan. 1, 1920, rebuilt 70%, others 50%; Jan. 1, 1920-Dec. 31, 1929, rebuilt 80%, others 60%; Jan. 1, 1930-Dec. 31, 1935, rebuilt 90%, others 70%; Jan. 1, 1936 and after, rebuilt 95% others 75%. Dealers except retailers, must be licensed. Prescribes methods for determining prices in sales by Defense Plant Corp.

No. 2—Secondary aluminum, scrap, effective March 24, 1941; last amended March 31, 1943. Secondary ingot base price is 15.00c per lb. lots of 30,000 lbs. or more, f.o.b. shipping point. Maximums for low-grade ingot are: No. 122 type piston alloy, 14.50; No. 2 grade No. 12 foundry alloy, 14.50; chemically specified and sold in small quantical warfare service ingot, 99½% plus, 14.50; deoxidizing aluminum, notch-bar, granulated or shot, including any ingot (exclusive of hardeners) containing more than 2.0% iron, 14.75 for 95-97½%; 14.50 for 92-95%; 14.00 for 90-92%; 13.50 for 85-90%; 12.50 for less than 85%. Two cents may be added for special shapes of deoxidizing aluminum. Special prices for ingots containing costly ingredients, for hardeners, and for grades not otherwise specified and sold in small quantities may be applied on approval of WPB. Add ¼-cent for 10,000-30,000 lbs., ⅛-cent 1000-10,000 lbs.; 1 cent under 1000 lbs. Secondary smelters may add ⅛-cent for ingot made from 17S, 24S or 52S scrap for which special premiums have been paid.

Scrap prices in cents per lb., f.o.b. point of shipment, for lots of less than 1000 lbs., 1000-20,000 lbs. and 20,000 lbs. or over, respectively are as follow. Plant Scrap—segregated 2S solids, 10.00, 11.00, 11.50; all other solids, 9.50, 10.50, 11.00; borings and turnings, 7.50, 8.50, 9.00. Plant scrap, mixed: all solids, 8.50, 9.50, 10.00; borings and turnings, 6.50, 7.50, 8.00. Obsolete Scrap—pure cable, 10.00, 11.00, 11.50; old sheet and utensils, 8.50, 9.50, 10.00; old castings and forgings, 9.00, 9.50, 10.00; pistons free of struts, 9.00, 9.50, 10.00; deduct 2 cents for pistons with struts. Special premiums may be paid for specified grades of scrap when baled or briquetted. Drosses, skimmings, sweepings, savings, spatters, containing: 15% or more aluminum, 8c per pound of aluminum contained; under 15%, 1.2c per pound of material, irrespective of quantity. If delivery is made to buyer's receiving point by public carrier, actual transportation charge may be added to maximum f.o.b. price under specified conditions. WPB-approved toll agreements are excluded from operation of price ceilings. Details of transactions must be filed within 10 days of contract. Toll processors must report by 15th of each month on preceding month's transactions.

No. 3—Secondary zinc and scrap, effective March 31, 1941; last amended Feb. 2, 1942. Replaced by new order No. 3 on March 12, 1943. Secondary zinc, cents per lb., carlots, E. St. Louis: 8.25, for prime western and poorer grades, 8.35 for selected, 8.50 for brass special, 8.75 for intermediate and higher. Zinc failing to meet Prime Western specifications must sell below maximum for that grade. New formula equalizes prices for carload and less-than-carload lots except for quantity premiums which are for producers: 0.15c for 20,000 lbs. to carload; 0.25c for 10,000-20,000 lbs.; 0.40c for 2000-10,000; 0.50c for less than 2000 lb. Other sellers' extras 0.65c, 0.75c, 1.00c and 1.50c respectively. Maximum prices for scrap materials in cents per lb f.o.b. point of shipment are: New zinc clippings and trimmings 7.25, engravers' and lithographers' plates 7.25; old zinc 5.75; add ½-cent for single shipments of 10,000 pounds or more. Unwanted zinc dross 5.80; die cast slab 5.80, new die cast scrap 4.95; radiator grilles 4.95; old die cast scrap 4.50; add ¼-cent for single shipments of 20,000 pounds or more. "Single shipment" means deliveries within 48 consecutive hours. Grades may be combined.

No. 4—Iron and steel scrap, effective April 3, 1941; last amended Feb. 11,1943.

The maximum price at which any grade of scrap (other than railroad) may be delivered to a consumer wherever located is the shipping point price plus actual transportation charges and 3% property transportation tax. With certain stated exceptions the maximum delivered price shall not exceed by $1 a ton plus March 18 freight increase the nearest maximum base price in terms of transportation charges. The maximum shipping point price is found by taking

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most favorable basing point and subtracting the lowest transportation charge. Maximum shipping point price for No. 1 steel at Boston $15.05, at New York or Brooklyn $15.33. Minimum shipping point price anywhere is $13 except specified Gulf ports where minimum is $14. Maximum freight on any scrap shipped from New England $6.65 a ton.

Brokers allowed 50-cent commission above maximum prices to consumers. No commission payable for preparation of scrap, except under preparation-in-transit provision.

Base prices on open hearth grades $20, delivered consumers' plants at Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Weirton, Steubenville, Youngstown, Warren, Canton, Sharon; $18.75 Chicago, Coatesville, Claymont, Conshohocken, Phoenixville, Harrisburg, Sparrows Point; $19.25 Buffalo; $19.50 Cleveland, Cincinnati, Ashland, Ky., Portsmouth, O., Middletown, O.; $18.25 Kokomo, Ind., Bethlehem, Pa.; $18 Duluth; $17.85 Detroit; $17.50 St. Louis; $17 Atlanta, Alabama City, Birmingham, Los Angeles, San Francisco, Pittsburg, Calif.; $16.50 Minnequa, Colo.; $14.50 Seattle. For No. 1 railroad heavy melting steel add $1 to above prices at centers which are basing points for railroad grades.

No. 1 cupola cast $18 at shipping points in Montana, Idaho, Wyoming, Nevada, Utah, Arizona, New Mexico; $19 in North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas, Florida; $20 in other states and Kansas City, Kans.-Mo.

Unprepared scrap, except heavy breakable cast, $3.50 per gross ton less than prepared, material for compressed bundles $4 less.

No. 6—Iron and steel products, issued April 16, 1941 freezing basing point prices at levels prevailing March 31, 1941; revised June 20, 1941 to establish base prices at April 16, 1941 levels. Revised Feb. 4, 1942.

Basing point prices are those announced by (1) U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing point; or (2) those prices announced or customarily quoted by other producers at the same designated points. Exception: Base prices under (2) cannot exceed those under (1) except to extent prevailing in third quarter of 1940. Extras may be applied only if charged during two years prior to April 16, 1941. Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific points are deemed basing points except producers may charge governing basing point prices plus rail rates to the latter two areas where water transportation is not available. Domestic ceiling prices are the aggregate of (1) applicable basing point price (2) extras (3) transportation charges to point of delivery as customarily computed. The applicable basing point may be (1) the basing point nearest the consumer providing the lowest delivered price or (2) the basing point at or closest to the place of production or origin of shipment (provided the war emergency requires shipment to be made to place outside mill's usual market area). Contracts drawn prior to April 16,1941 at other than Schedule prices may be continued until March 15, 1942. Export ceiling prices may be either the aggregate of (1) domestic basing point nearest place of production (2) export extras (3) export transportation charges or the f.a.s. seaboard price of the U. S. Steel Export Co. on April 16, 1941.

Amendment, Sept. 17, 1942, fixes prices on flat-rolled rejects at 85% of base and applicable extras on prime material; wasters at 75%; waste wasters at 65%, except plates which take waster price, tin plate which is $2.80 per 100 lbs. and terne plate which is $2.25 per 100 lbs.; semifinished at 85%. Transportation costs to delivery point may be added. Other off grades may not be sold at prices above levels of primes.

No. 8—Nickel scrap and secondary materials effective June 2, 1941; last amended June 17, 1942. Maximum prices to makers on nickel and nickel alloy scrap unprepared for consumption, cents per lb., f.o.b. point of shipment:

Nickel scrap containing 98% or more nickel not more than 0.50% copper 26.00 per lb.: 90-98% nickel 26.00 per lb. of nickel contained only. Converters (dealers) allowed 2-cent premium in selling to consumers. Shipments of 2000 lb. or more by maker or converter take ⅛-cent premium.

Ferro-nickel-chrome-iron scrap containing 20-90% nickel 26.50 per lb. of nickel contained. 8.00 per lb. of chrome. Converter's premium 1¼ cents. Quantity extra ½-cent 10,000 lb. or more.

Ferro-nickel-iron scrap containing 14-90% nickel 26.50 per lb. of nickel contained. Converter's premium 1⅛ cents. Quantity extra ½-cent 10,000 lb. or more.

Monel metal clippings 20.00 per lb.; soldered sheet 18.00; No. 1 castings, turnings 15.00. Converter's premium 2 cents. Quantity extra ½-cent 20,000 lb. or more. Cupro-nickel containing 90 per cent or more combined nickel, copper 26.00 per lb. of nickel contained, 8.00 per lb. of copper, only. Converter's premium 2 cents. Quantity extra ½-cent 20,000 lb., or more.

Straight chromium-type sheets, clippings, solids $35 gross ton for 12-14% chromium, $40 for 14-18%, $40 plus 9.50c per lb. for each lb. chromium in excess of 18% for grades containing over 18% chromium. Deduct $5 ton for borings and turnings. Secondary Monel ingots and Monel shot 27.00c per lb., copper-nickel shot 25.50c. Import prices placed at domestic levels. MRC purchases of stocks of metallic nickel frozen by M-6-b are exempted.

No. 10—Pig Iron, effective June 24, 1941; last amended March 3, 1943. Freezing prices at levels generally prevailing in second quarter of 1941. Governing basing point prices (gross tons):

No. 2 foundry $25 Bethlehem, Everett, Swedeland, Birdsboro, Sparrows Point; $24 Erie, Neville Island, Sharpsville, Buffalo, Chicago, Granite City, Cleveland, Hamilton, Toledo, Youngstown, Detroit; $24.50 Duluth; $20.38 Birmingham, $22 Provo.

For basic iron deduct 50 cents from above, Birmingham base $19, Buffalo, $23.

Malleable: $25.50, Bethlehem, Everett, Swedeland, Birdsboro; $24.50 Erie, Buffalo, Duluth, $24 Neville Island, Sharpsville, Chicago, Granite City, Cleveland, Hamilton, Toledo, Youngstown, Detroit.

Bessemer $26 Bethlehem, Everett, Swedeland, Birdsboro; $25 Erie, Buffalo, Duluth, Birmingham; $24.50 Neville Island, Sharpsville, Chicago, Granite City, Cleveland, Toledo, Youngstown, Detroit.

Low phos $29.50 Steelton, Birdsboro, Buffalo. High silicon silveries (6.00-6.50% base) $29.50 Jackson County, O., $30.75 Buffalo. Gray forge $23.50 valley or Pittsburgh. Charcoal $28 Lake Superior, high phos. $28.50, Lyles, Tenn., low phos $33 Lyles.

Ceiling prices are aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to place of delivery as customarily computed. Amendment, effective Aug. 21, 1942, adjusts prices on shipments from Buffalo when made all-rail to points formerly supplied by barge.

In the case of exports only basing point nearest place of production may be used. Differentials: Silicon 50 cents for each 0.25 point in excess of 1.75-2.25 base. Phosphorous 38 cents for content of 0.70% and over. Manganese 50 cents for each 0.50% over 1.00%.

Add $2 per ton for pig iron containing ⅛ to ¾% nickel with $1 a ton allowed for each additional ¼%.

No. 12—Brass mill scrap, effective July 22, 1941; last amended April 15, 1943. Maximum prices cents per lb. f.o.b. point of shipment for heavy scrap, rod ends and turnings, respectively: Copper 10.25, 10.25, 9.50; tinned copper 9.62½, 9.62½, 9.37½; yellow brass 8.62½, 8.37½, 7.87½; 95% plus commercial bronze 9.50, 9.25, 8.75; 90-95% commercial bronze 9.37½, 9.12½, 8.62½; 80% min. red brass 9.12½, 8.87½, 8.37½; 71-80% best qual. brass 8.75, 8.50, 8.00; 5% nickel silver 9.25, 9.00, 4.62½; 10% ni. sil. 10.12½, 9.87½, 5 1/16; 15% ni. sil. 10.87½, 10.62½, 5 1/16. Above prices for less than 15,000 lbs. any kind or grade; add ¾-cent for 15,000-40,000 lbs. shipped at one time, 1 cent 40,000 or more. Ceilings may be exceeded through addition of duty on imported metal.

Buyers of specially prepared brass mill scrap, other than a brass mill, a brass and bronze ingot maker or a copper smelter or refiner may be granted by letter a special price upon application.

No. 15—Copper, effective Aug. 12, 1941; amended Aug. 28, 1941, Feb. 1, 1942. Maximum base prices for electrolytic, lake or other fire refined copper in wire bars or ingot bars made to meet ASTM specification B5-27 for electrolytic and B4-27 for lake 12.00c lb. delivered in carlots Connecticut valley. Casting copper in wire bars or ingot bars fire refined to 99.5% purity, including silver as copper, 11.75c lb., f.o.b. refinery in carlots, 12.00c in less carlots.

Apply usual delivery differentials for other points. Add ⅛-cent on l.c.l. lots of electro, lake or fire-refined purchased from producers. Prices are gross before deduction of discounts and include commissions.

For other kinds, grades, shapes, forms apply customary premiums or discounts in effect Aug. 11, 1941. Other than producers (dealers) may charge following premiums, casting copper excepted: 0-499 lbs. 2c; 500-999 1½c; 1000-4999 1c and 5000 to carload ¾c.

No. 17—Pig tin, effective Aug. 16, 1941; last amended April 16, 1943. Prices ex New York dock or warehouse for foreign tin, ex producers plant for domestic; Grade A 99.80% or higher, 52.00c, lots of 5 tons or more. Grade B 99.75-99.79% inclusive and 99.80% or higher not meeting grade A specifications, 51.62½c; Grade C Cornish refined (99.808%), 51.62½c; Grade D 99.00-99.74% pure, inclusive, 51.12½c; Grade E below 99%, 51.00c, for tin content. For 2240-11,199 lbs. incl., add 1c; 1000-2239 incl. 1½c; 500-999 incl. 2½c; under 500 lbs. 3c. Following premiums over maximum prices are allowed for export sales: 1c per lb. on 11,200 lbs. or more; 1¼c on 2240-11,199 lbs.; 2c on less than 2240 lbs. Cost of packaging and other legitimate charges may be added. Premium for special shapes (except tin anodes whose maximum prices are established at March, 1942 levels) 7 lbs. or less is 1¼c per lb.; no premium over 7 lbs.

No. 20: Copper Scrap and Copper Alloy Scrap, effective March 22. Replaces revised price schedule No. 20, as amended. Brings under specific prices the entire field of copper scrap and copper alloy scrap by establishing specifications and cents-per-pound prices for 16 new grades of material. Provides that any grades that do not meet any of the specifications for listed grades other than refinery brass must be sold as "refinery brass." Allows quantity premium of 0.75 cents per pound for shipment of 60,000 pounds of one group number and an additional 0.50 cent per pound for a minimum of 20,000 pounds of one other group number when shipped together in one car. Maximum prices for the new grades established in the order on the basis of f.o.b. point of shipment in cents per pound of material are as follow: copper borings, 9.75; copper tuyeres, 8.75; tinny bronze borings, 10.50; copper-nickel solids and borings, 9.25; aluminum bronze solids, 9.00; contaminated gilding metal turnings, 8.50; mixed brass screens, 7.75; old nickel silver solids and borings, 6.25; copper-lead borings, 6.25; and zincy bronze borings, 8.00. Maximum prices vary with analysis of high grade low lead bronze borings, soft red brass borings, manganese bronze solids, and manganese bronze borings. For purposes of classifying turnings and borings, the button analysis shall govern; for pricing purposes, the wet or natural analysis should govern. Eliminates reduction in price for No. 2 copper wire and mixed heavy copper and for light copper when bought by inspection instead of by analysis. Revises formula and method for pricing high-lead bronze and changes specifications for both high-lead bronze and high-lead bronze borings which reduce the price ½-cent per pound. Reduced maximum price of cocks and faucets from 8.00c to 7.75c per pound. Transfers No. 1 tinned copper wire from Group 2 to Group 1. Requires that a deduction be made for the cost of removing the covering from lead-covered copper wire and cable similar to that applicable to insulated copper. Allows a special preparation premium of 2.50 cents per pound for putting manganese bronze solids into crucible shape. Broadens specification of soft red brass borings to keep material with valuable tin content from being classified as refinery brass. Provides for a deposit charge of $1.00 for steel drums when delivery is made by a carrier other than a public carrier. Permits small ingot makers to apply for authority to pay the crucible shape premium as well as to apply for permission to pay the briquetting premiums. Contracts made prior to March 22 under provisions of Revised Price Schedule No. 20, as amended, may be carried out until April 12.

No. 22—Pennsylvania grade crude oil, effective Aug. 23, 1941. Pennsylvania Bradford crude per barrel $2.75; Southwest Pennsylvania crude $2.40; Eureka $2.34; Southeastern Ohio $2.30; Oil City-Titusville group A $2.68.

No. 29—By-product blast furnace and foundry coke, effective Oct. 1, 1941, amended Jan. 28, 1943. By-product foundry coke f.o.b. cars at ovens: Alabama $8.50; Chicago $11.50; Ashland, Ky., Ironton, O., Portsmouth, O., Fairmont, W. Va. $10, Detroit, Buffalo, Erie, Pa., Philadelphia $11.75; Kearny, N. J. $12.15; Painesville, O. $11.25; Chattanooga, $9; Milwaukee $12.25. Delivered prices: Chicago, Detroit, Erie $12.25; St. Louis and East St. Louis $12.25 ($12.75 for producers outside Missouri, Alabama, Tennessee); Indianapolis, Terre Haute $12; Buffalo $12.50; Cincinnati $11.75; Cleveland $12.50; Philadelphia $12.38; St. Paul, Minn. $14; New England $13.75, provided freight from Everett not over $3.10, less 15 cents for cash ten days.

By-product blast furnace coke: 75 cents net ton above weighted average f.o.b. oven price in first quarter 1941. Does not apply to sales or shipments at less than $6 f.o.b. Consumers may be billed transportation tax of 4c per net ton of coke paid on coal used.

No. 36—Acetone, effective Oct. 27, 1941, last amended Oct. 3, 1942. Revised prices effective Oct. 3, 1942, in cents per lb. delivered in Eastern territory, (add ½-cent for Western territory): 7.0 in tank cars, 8.5 carloads in drums, 9.0 less carloads in drums. Eastern territory includes New Mexico, Colorado, Wyoming, Montana and states east thereof.

No. 40—Builders hardware, effective Nov. 19, 1941. Maximum prices for manufacturers and jobbers are highest levels prevailing during 15-day period ended Oct. 14, 1941. Includes insect screen as well as such items as knobs, brass model locks, hinges, etc. Steel insect screen eliminated, Jan. 16, 1942. Amendment, Oct. 21, provides licensing control.

No. 41—Steel castings, effective Dec. 1, 1941; last amended March 27, 1943. Maximum prices are those prevailing on July 15, 1941. Places ceiling for railroad specialties at Oct. 1, 1941, levels. Permits producers of railroad specialty castings to charge for certain extras, coupler repair parts and pattern costs customarily charged between Oct. 1-15, 1941. Permits addition of extra freight costs on shipments of castings beyond foundries' normal shipping area. Authorizes foundries to add all transportation costs above 50c per 100 lb.; to sell less than 100 lb. f.o.b. the foundry. Exempts from control castings whose production costs are less than $100.

No. 43—Used Steel Drums, Pails, and Containers, Dec. 1, 1941; last amended April 22, 1943, maximum prices are: for 5½-gallon used steel pails 57.00c delivered, subject to deductions specified in Appendix B of the schedule, when reconditioned; 25.00c with cover, 12.00 cents without cover, and 6.00 cents for cover alone in their "raw" condition before reconditioning. Sets maximum prices for used steel containers of 22 U. S. Standard gauge or lighter, of any capacity that are suitable for reuse with or without reconditioning and that are bought by a filler directly from the person who empties the container at 15.00 cents for used containers of 20-gallon capacity or less, and 25.00 cents for those with more than 20-gallon capacity. The prices are f.o.b. the place at which they are emptied.

No. 46—Relaying rails, effective Dec. 2, 1941. Last amended Dec. 14, 1942. Maximum price for rails 35 pounds or heavier originating from Class I railroads, switching or terminal companies, $28 per gross ton, f.o.b. any station on the railroad. Dealers or jobbers may charge $30 in resale. Originating other points $30 minus lowest rail freight to base nearest shipping point, but no less than $24. Basing points are Boston, Philadelphia, Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, Savannah, Ga., Norfolk, Va., Duluth, St. Louis, Birmingham, Houston, Los Angeles, San Francisco, Portland, Oreg., Seattle, Denver. Maximums on warehouse sales $35.84 a gross ton in carlots for 45-60 lb. rails, $39.20 for 35-45 lb. rails; $45 for less than 35 lb. rails. Relaying girder rails are $45 f.o.b. shipping point minus lowest railroad charge to basing point but not less than $39 per ton. Sellers must be licensed. Operation of recognized warehouse must be declared to OPA by Dec. 10, 1941.

No. 49—Iron and Steel Products at Resale, effective Dec. 15, 1941, last amendment effective April 15, 1943. Fixes prime prices generally at April 16, 1941, levels. Specific prices and maximum quantity extras established at 30 points for bars, plates, structurals, sheets and strip. For cold-drawn and seamless tubing use prices charged by National Tube Co. distributors; for tool steels, by Crucible Steel Co. For less-carload lots of standard nails, annealed and galvanized wire for local delivery use mill carload price (minus 15c jobber allowance) add carload freight to warehouse, plus additions of 50c for nails, 60c for annealed wire, 68c for galvanized wire. For outside delivery add less-carload freight. Markup on export sales of all products is limited to 5% for agents, 10% for merchants. Sellers of merchant wire products allowed at least a 20% mark-up over mill carload delivered prices. Following are freight allowances for products sold on Pacific coast: 75 cents per 100 lbs. on plates, 65 cents on hot and cold rolled sheets, 45 cents on structurals and galvanized sheets, 25 cents on hot rolled strip, 20 cents on hot rolled merchant bars. Maximum prices for N.E. steels are established as the mill price plus analysis extras and 66⅔% of aggregate of base price and mill analysis extras. Additional extras of $1.25 per 100 lb. for stress relieving after cold working; $2.50 for aircraft quality; and 40 cents for extensometer test may be added for N.E. steels. Additional extra for treatment given at outside plant is allowed as follows: invoice cost to seller, minus trucking charge, plus 30c per 100 lb., provided no additional charges may be made. Export price control on distressed and stranded material is provided in order No. 13. Sets maximum prices for reconditioned cotton bale ties.

Amendment, effective March 1, 1943, establishes specific base prices for secondary products, including hot rolled, cold rolled, galvanized, galvannealed and long terne sheets; hot and cold rolled strip; sheared and universal mill plates; tin mill black plate. Schedules extras and other charges that can be added to base prices. Establishes delivered prices for semifinished products at 110 per cent of the mill prime price. Amendment No. 14, issued April 9, sets up specific prices for products sold by warehouses in four Atlantic coast zones.

No. 67—New machine tools, effective Jan. 21, 1942; last amended Dec. 31, 1942. Maximum prices for dealers and manufacturers are Oct. 1, 1941 lists or, in absence of such list, last price at which similar articles sold between Jan. 1 and Oct. 1, 1941. Permits sales and deliveries at above-ceiling prices pending OPA ruling on petition for approval of such prices.

No. 69—Primary Lead, effective Jan. 15, 1942; last amended Jan. 20, 1943. Maximums in cents per pound in carloads delivered St. Louis: Pigs—Common lead 6.35; corroding lead 6.45; chemical lead 6.45; copperized lead 6.40 when made from common lead, 6.50c when made from corroding lead. Billets, add 0.25. Ingots or linked ingots, add 0.50.

No. 70—Scrap and secondary lead, effective Jan. 15, 1942; last amended Jan. 20, 1943. Maximum scrap prices f.o.b. point of shipment are determined by deducting from the maximum prices for common lead at various basing points the following: 53c for soft, hard and cable lead scrap and 65c for battery lugs and lead content of lead covered copper cable. Fixes prices for copper content of lead-covered copper cable in accordance with Schedule No. 20. Maximum secondary prices f.o.b. point of shipment, carlots, determined by applying following differentials to basing points for common primary pig lead: Low grade pig (minus 99.73%) deduct 0.15c; low grade ingots, linked ingots and billets plus 0.10c; high grade (99.73% plus), base price; high grade ingots linked ingots and billets add 0.25c. Maximum price for antimonial lead in carlots is 15½c per lb. of contained antimony plus base price of lead for remainder; except that sales made before Jan. 20 may be carried out at contract prices until Feb. 19, 1943.

No. 71—Cadmium, effective Jan. 19, 1942, last amended Oct. 26, 1942. Maximum prices for primary and secondary metallic cadmium per pound delivered are 95c for anodes, balls, discs and other special or patented shapes, 90c for bars, ingots, pencils, pigs, plates, rods, slabs, sticks and other regular straight or flat forms. Sets maximum for 5 lbs. or less in containers at highest level pricing contracts.

No. 75—Dead-Burned Grain Magnesite, effective Jan. 28, 1942; last amended June 20, 1942.

Maximum prices per ton f.o.b. Chewelah, Wash., are $22 in bulk, $26 in bags or sacks. Westvaco Chlorine Products Corp. may change regular California customers $10 higher from Patterson plant or from stocks at Permanente. Westvaco may charge vanadium Corp. of America and Mathieson Alkali Works $40.50, f.o.b. Patterson. For export add $7.50 a net ton when packed in double jute sacks, $12.50 in wooden barrels.

No. 77—Beehive Furnace Coke, effective Jan. 26, 1942; last amended April 6, 1943. Maximum for this grade produced in Pennsylvania and Monongalia, Preston and Upshur counties of W. Va., $6.50 per net ton, f.o.b. cars ovens, Connellsville, Pa. Does not apply to foundry coke. Operators of hand-drawn ovens using trucked coal may charge $7.00. Consumers pay 4c transportation tax and transportation charges from Connellsville to place of delivery.

No. 80—Lithopone, effective Feb. 2, 1942. Maximum prices cents per lb. delivered in bags in carlots in New Mexico, Colorado, Wyoming, Montana and eastern states: Normal 4.25; high strength barium, calcium 5.60; high strength magnesium 5.75; titanated 5.60; zinc sulphide 8.25. Add ¼-cent for less carlots. Prices other states ¼-cent above eastern territory. Sellers must be licensed.

No. 81—Primary Zinc, effective Jan. 29, 1942. Maximum carload prices in cents per lb., f.o.b. E. St. Louis, Ill.; Prime western 8.25; selected 8.35; brass special 8.50; intermediate 8.75. High grade and special high grade are 9.25, delivered. Producers may add 0.15c for 20,000 pounds to carlots, 0.25c for 10,000-20,000 pounds, 0.40c for 2000-10,000 pounds, 0.50c for less than 2000 pounds. Other sellers may add 0.65c, 0.75c, 1.00c and 1.50c for respective quantities.

Amendment, March 13, 1942, requires producers to file with OPA copy of all toll agreements; smelters must file agreements involving zinc made to other than listed specifications which are revised in the amendment.

No. 82—Wire, Cable and Accessories, effective Jan. 29, 1942; last amended July 22, 1942. Includes hot rolled black or cleaned rods for electrical uses, and copper, copperclad or copper alloy wire used for conducting electricity. Maximum prices are manufacturers' and wholesalers' net prices on Oct. 15, 1941, with specified exceptions. Weatherproof wire prices figured against base price of 17.5 cents. For material containing lead, add number of pounds of lead times 0.325c.

No. 93—Mercury, effective Feb. 4, 1942. Prime virgin mercury produced in California, Oregon, Washington, Idaho, Utah, Nevada or Arizona, $191 per 76-pound flask. When produced in Texas or Arkansas, $193. When imported from Mexico, $193, f.o.b. United States freight station nearest point of entry, including duty. Other imports $191, f.o.b. port of entry. Agent's selling commission limited to 1% of maximum price. Amendment, effective Feb. 10, 1942, permits dealers with stocks on hand or in transit Feb. 4 to deliver such stocks until March 2, 1942, at prices necessary to meet contracts made prior to Feb. 4. Verified statement of such transactions must be filed with OPA.

Amended March 17, 1942, to permit dealers to split with another dealer or broker the 2 per cent premium allowed.

No. 96—Domestic Fuel Oil Storage Tanks, effective Feb. 20, 1942. Typical prices for carload shipment of 26-inch, 16-gage steel, 275-gallon capacity tank are $17.35 in the East, $17.70 in the Midwest, $31.95 in the Far West. Amendment Oct. 21, provides licensing control.

No. 98—Titanium Pigments, effective March 1, 1942. Prices are those prevailing Oct. 1, 1941. Regular grade, 20 tons or more, delivered in bags in eastern territory, 14½c per pound. Deliveries in western territory ¼-cent higher. Amendment Oct. 16, provides licensing control.

No. 100—Cast Iron Soil Pipe and Fittings, effective Feb. 20, 1942; last amended Oct. 21, 1942. Prices established in terms of minimum discounts from standard revised price list. Minimum discount for 2-6 inch extra heavy pipe 52½-10-10 for carload shipments by rail or 10-ton or greater shipment by truck, 52½ for less-carload by rail or less than 10 tons by truck. Permits warehouse sellers to compute delivery charges by method employed Oct. 1, 1941, and producers to compute delivered prices on emergency shipments of less than 250 pounds in same manner as warehouse shipments are determined. Establishes prices for "Victory" sizes and revises method of determining maximum

prices for less-carload lots of all sizes. Provides licensing control.

No. 113—Iron Ore, effective April 10, 1942. Applies to ore produced in Minnesota, Wisconsin and Michigan. Maximums are weighted average spot prices, based on Lower Lake ports delivery, at which spot sales of such ore were made during 1941 shipping season. "Escalator" clause eliminated from unexpired contracts. Maximum for ore shipped from mine idle in 1940 and 1941 is equivalent of $4.45 per gross ton, Lower Lake ports, for Mesabi Nonbessemer 51.50% iron, adjusted for grade and analysis. Base prices on other grades: Mesabi Bessemer $4.60; Old Range Nonbessemer $4.60; Old Range Bessemer $4.75; High Phosphorus $4.35. Penalties for silica and fine structure and premium for lump ore for open hearth use are those prevailing in 1941. Producers must report by 10th of month on preceding month's production and sales. Amendment, July 2, 1942, excludes exchanges of ore between producers from regulations, also Minnesota ore mined south of Minneapolis. Amendment, effective Dec. 1, permits owners to charge buyers the exact increase in freight rate for December shipments.

No. 120—Bituminous Coal, May 18, 1942. Fixes mine prices with certain exceptions at Oct. 1-15, 1941, levels.

No. 121—Miscellaneous Solid Fuels, May 18, 1942; last amended April 6, 1943. Fixes producers prices generally at Dec. 15-31, 1941, levels.

No. 122—Solid Fuels, May 18, 1942, last amended Nov. 1, 1942. Fixes prices for dealers other than producers at Dec. 15-31, 1941 levels plus subsequent increases in purchase costs.

No. 124—Rolled Zinc Products, May 11, 1942; last amended Dec. 9, 1942. Fixes producers' prices at Nov. 29, 1941 levels. Oct. 1, 1941, discounts must be maintained.

No. 125—Nonferrous Castings, May 11, 1942; last amended March 1, 1943. Fixes producers' prices at either the Oct. 1-15, 1941, or May 11, 1942 to Jan. 31, 1943 levels. Exempts foundries which do less than $12,500 business in a quarter; others must file pricing formulas with OPA. Old contracts may be carried out at former prices until April 1.

No. 126—Fluorspar, May 11, 1942; last amended Nov. 17, 1942. Fixes producers' prices at a range of $25 to $28 per short ton for metallurgical grade, according to calcium fluoride and silica content; in the western area at $32 per ton for acid grade with minimum calcium fluoride of 97½% and maximum silica of 1½%. Both are subject to freight adjustments.

No. 136—Machines and Parts, effective July 22, 1942; last amended May 1, 1943. Maximum prices for one specified list of new units are those in effect Oct. 1, 1941; or for another specified list, those in effect March 31, 1942. March 31, 1942 also is basing date for machinery services. For rebuilt and guaranteed units maximums f.o.b. sellers place of business are 85% of maximum price, f.o.b. factory, of nearest equivalent new machine; for unit sold "as is", maximum is 55% of new unit price. Price may be determined by using base price less specified depreciation rate. March 31, 1942, is base date for pricing special gages, automotive parts (not including services), siren blowers. Hand-operated tools designed for work on military equipment retain prices at about March, 1942, levels. Manufacturers' and wholesalers' maximum prices for automotive and lead acid storage batteries are their Feb. 1, 1942, prices; or Oct. 1, 1941, list prices plus one cent per lb. of lead content. All dealers, except retailers, must be licensed. Addition of 9.625c per fine troy ounce of silver contained may be added to maximum price as otherwise determined. Maximum price for large-scale refrigerators and air-conditioning equipment, sold to war industries, is installation costs to the user plus original cost less depreciation at 5% per year. Aircraft makers exempt from filing repair parts price lists. Maximums for gear and speed reduction items are those charged Oct. 15, 1941, except for specified purposes for which March 31, 1942, prices are the base. Provides formula for determination of prices by converted plants. Exempts blanket leases by Defense Plant Corp. of machines and machinery parts; developmental contracts and subcontracts when certified as "developmental" by a government agency but manufacturer must report within 10 days unless contract is "confidential" or "restricted".

No. 138—Ferromanganese, May 1, 1942. Carload lots of 78-82% grade, f.o.b. Atlantic Seaboard, $135 per gross ton. Differential for each 1% manganese down to 75% and up to 85% is $1.70. Prices are f.o.b. Rockdale or Rockwood, Tenn., for Tennessee Products Corp., Birmingham for Sloss Sheffield Steel & Iron Co. Extras per gross ton: $6 for packed carload lots; $10 for gross ton lots packed; $13.50 for less than ton lots when packed down to 200 pounds, $18 when less than 200 pounds. Premiums for crushing to specified mesh are those of April 28, 1942. Amendment, July 25, sets maximums for 3-lb. briquettes containing 2-lb. manganese in cents per pound, f.o.b. shipping point, at 6.06 carload, unpacked; 6.31 carloads, packed; 6.56 ton lots, packed; 6.81 200-lb. to gross tons; 7.06 less than 200 lb., packed.

No. 147—Bolts and Nuts, effective May 28, 1942. Maximum prices for bolts, nuts, screws and rivets set at Oct. 1-15, 1941, levels.

No. 159—Concrete Reinforcing Bars, (fabricated) effective June 15, 1942; last amended Jan. 20, 1943. Allows fabricator margin of 50 cents per 100 lbs. above f.o.b. mill price. Maximum delivered price of fabricated bars in cents per lb., 2.40. Exceptions: 2.77 if bought by fabricator at Gulf basing point price, 2.80 at Pacific Coast basing point; 2.57 delivered Toledo; 2.52 in carloads delivered Detroit.

No. 166—Zinc Oxides; effective May 11, 1942. Maximum delivered price for carlots of leaded zinc oxides containing 35% or more lead 7.00c per lb. Premium for l.c.l. ¼-cent.

No. 174—Freight Car Materials, effective July 2, 1942. Establishes maximum prices for surplus car materials sold by one builder to another or to a railroad as the total of the following: Selling car builder's net invoiced cost or maximum price otherwise established by OPA for purchase of such material, at the time of sale pursuant to such Order No. L-97-a-1, as amended, whichever is lower; inbound freight paid by seller; direct labor costs, if any, in fabricating such material, determined on basis of labor rates of Oct. 1. 1941; and state sales or retailer's occupational tax levied on such sale.

No. 175—Rolled Glass, effective July 11, 1942. Establishes specific maximum prices for producers of rolled and wire glass, principally at Oct. 1-15, 1941 levels.

No. 188—Manufacturers' Prices, issued July 29, 1942; last amended April 2, 1943. Sets methods for determining manufacturers' maximum prices for new product lines introduced since April 1. Producers of specified articles may add 36c for each ounce of silver contained. Provides method for granting price relief.

No. 195—Industrial Wooden Boxes, effective Aug. 8, 1942; last amended March 20, 1943. Maximum prices are March 31, 1942, lists or prices based on costs applicable on that date. Sellers must be licensed.

No. 198—Silver Bullion, effective Aug. 10, 1942. Establishes maximum price for bullion in form of standard commercial bars at 35.375c per troy ounce, f.o.b. New York or San Francisco. Amendment Aug. 31, raises price to 45.00c. Supersedes provisions of General Maximum Price Regulation.

No. 199—Lead Bullet Rod, effective Aug. 13. Maximum price is 1.10c per lb. above cost to producer of required metal ingredients. Differential for inexperienced producers is 1.25c for first 200 tons of rod made.

No. 202—Brass and Bronze Ingot and Shot, Aug. 19, 1942; last amended April 12, 1943. Maximums are 12.25c for 85-5-5-5; 16.50c for 88-10-2; 16.75c for Navy "G"; 14.75c for Navy "M"; 14.25c for 80-10-10; 10.00c for yellow; 15.75c for aluminum bronze; 12.75c for 60-65 manganese bronze; 15.50c for silicon bronze. Maximums for special "trade name" ingots are peak prices in carload lots in effect March 31, 1942, less 10%. Establishes standards for determining maximum prices for shot.

No. 204—Idle or Frozen Materials, effective Aug. 20, 1942; last amended March 22, 1943. Establishes formulas for pricing such materials sold under Priorities Regulation No. 13. Establishes MRC prices for idle or frozen stocks of tin oxide and tin anodes; iridium, iridium alloys and iridium-containing scrap; copper-base alloy products, including insect screening; cadmium; manila rope.

No. 214—High Alloy Castings, Sept. 3, 1942. Establishes maximum prices, effective Sept. 7, at levels prevailing Oct. 1-15, 1941.

No. 218—Eastern Wooden Mine Materials, effective Sept. 8; last amended Jan. 11, 1943. Sets specific maximum prices for standard and round pit posts, mine caps, wedges, cribbing block, ties, crossbars and switch ties.

No. 224—Cement, effective Sept. 23, 1942, last amended Oct. 23, 1942. Sets up specific maximum prices for 12 districts, covering sales by manufacturers.

No. 230—Reusable Iron and Steel Pipe and Used Structural Pipe, effective Oct. 3, 1942; revised Feb. 3, effective Feb. 9, 1943. Establishes uniform price for used structural pipe of $35 per net ton plus charges for extra service. Sets prices for reusable galvanized pipe at 20% above black pipe prices for 1 inch and smaller and 15% for larger sizes. Sets specific maximum prices for standard sizes of pipe. Gives exact formula keyed to weight for odd sizes and weights of pipe; for certain grades of oil country casing and tubing.

No. 235—Manganese Steel Castings, effective Oct. 14. Establishes maximum prices for castings and products at levels prevailing in Oct. 1-15, 1941, period.

No. 236—Home Furnace Conversion Parts, effective Oct. 14, 1942, last amended April 23, 1943. Establishes maximum prices for parts and installation. Fixes specific prices for special combination and rectangular conversion grates.

No. 241—Malleable Iron Castings, effective Oct. 21, 1942; last amended April 15, 1943. Establishes maximum prices at highest price seller charged for similar castings between Oct. 1-15, 1941. If castings to be priced were not offered in this period, seller may apply pricing methods, costs, and profit margins used on Oct. 15, 1941; or may charge price at which he last contracted to sell similar one prior to Oct. 1, 1941.

No. 244—Gray Iron Castings, effective Oct. 26, 1942; last amended March 27, 1943. Sets maximums at highest prices quoted between Aug. 1, 1941, and Feb. 1, 1942. If same or similar casting was not offered in that period, seller can apply the pricing formula and cost factors used on Feb. 1, 1942; or can apply price at which he last sold a similar casting prior to Aug. 1, 1941; both subject to OPA approval. Excludes sellers whose net sales in 1942 totaled $40,000 or less.

No. 248—Manganese Ores, effective Nov. 9, 1942; last amended Feb. 15, 1943. Establishes following maximum prices per long ton unit, duty paid, for domestic sales of grades other than domestic battery or chemical ores, to any private buyer; (1) Metallurgical ores, manganese 48%, iron 6%, silica plus alumina 11%, phosphorus not over 0.18% on dry basis, 85c, Mobile and New Orleans; 90c, Norfolk, Baltimore, Philadelphia and N. Y.; 96c, Fontana, Pueblo, Provo; (2) For battery and chemical, other than domestic; a) highest charged for March deliveries; b) if no deliveries, highest quoted list price; c) price approved by OPA if not determined under a) or b). Exempts from price control sales of domestic ore to dealers for resale and to users or processors using ore directly for producing steel or in foundry operations, or in spiegeleisen, and other sub-standard ferromanganese.

No. 251—Construction of Buildings, effective Nov. 5, 1942; last amended March 12, 1943. Establishes ceilings equivalent of those generally in effect during March, 1942, adjusted for increases in labor costs between March 31 and July 1, 1942. Every contract over $500 must be reported to OPA within 10 days of award. Exempts from price control following types of contracts with Defense Plant Corp: Cost-plus-a-fixed-fee prime contracts and subcontracts; contracts performed on basis of costs only with no addition for profit.

No. 258—Chrome Ores, effective Nov. 9, 1942; last amended March 24, 1943. Base prices per ton are: $43.50, 48% metallurgical-chemical, f.o.b. railroad cars at N. Y., Philadelphia, Baltimore, Charleston, Portland, Tacoma, with special price for Montana ores; $61, lump refractory ore in bulk, f.o.b. Baltimore, Philadelphia, Chester, San Francisco; $35.55, lump refractory, packed in single cloth sacks, $40.80 in barrels, f.o.b. Baltimore, Chester, Plymouth Meeting; $36.50.

ground refractory, 24 mesh or coarser, f.o.b. Baltimore, Chester or Plymouth Meeting, Pa. Exempts sales of domestic ore to dealers who buy for resale; sales to Metals Reserve Co.

No. 261—Finishing Builders' Hardware, effective Nov. 13, 1942. Establishes maximum prices at highest prices received by manufacturer for delivery between Oct. 1, 1941 and March 31, 1942. Establishes percentage mark-ups which may be added to actual cost of materials under each contract held by persons other than manufacturers.

No. 272—Cast Iron Boilers, Radiators, effective Nov. 23, 1942. Establishes maximum prices at levels generally 5% below prevailing prices in case of boilers; 12% below in case of radiators. Maximums are based on Oct. 1-15, 1941, levels. Manufacturers must allow full carload rates of freight on shipments of 200 lb. or more.

No. 302—Magnesium, effective Jan. 20, 1943. Establishes maximum prices for remelt ingot, including transportation costs up to 75 cents per hundredweight, at 21½c for class A, 18½c for class B, 16c for class C in lots of 20,000 lb. or more. Add ¼-cent for 10,000 to 20,000 lb.; ½-cent, 1000 to 10,000 lb.; 1-cent, less than 1000 lb. Magnesium scrap prices in lots of less than 1500 lb., f.o.b. point of shipment, are in cents per lb.; Segregated plant scrap borings and turnings, 8.00; mixed or contaminated plant scrap, grade 1 solids 11.00, borings and turnings 7.00, grade 2 solids 9.00, borings and turnings 5.00; obsolete scrap uncontaminated 11.00, contaminated 9.00. Add 1 cent per lb. for sales in lots of 1500 lb. or more. Segregated plant scrap solids and magnesium residues are exempt.

No. 309—Platinum Metals, effective Feb. 1 in District of Columbia and Feb. 11, 1943 in rest of country. Establishes following prices for 99.5% purity; Platinum $35; palladium $24; ruthenium $35, rhodium $125; iridium $165, and osmium $50. Maximum for metals less than 99.5 per cent pure are established at the highest individual level prevailing during the Jan. 1 through March 31, 1942 period.

No. 310, Reusable Shapes, effective Feb. 1, 1943. Fixed ceiling price of 2.75c a pound, f.o.b. shipping point, on sales to consumer of reusable structural shapes, plates and shafting. Permits extra charge up to ¼-cent a pound for pieces delivered to specified length or drilled.

No. 314: Magnesium and Magnesium Alloy Ingot, effective Feb. 1, 1943. Establishes maximum prices in cents per pound for primary metal as follow: Commercially pure magnesium, 20.50; incendiary bomb alloy, 23.75; ASTM B80-41T No. 11, 25.00; ASTM 23.40; 50-50 magnesium-aluminum alloy. B94-40T No. 13, 25.00; all other alloys, 23.00. Primary magnesium alloy contracts at above-ceiling prices may be filled until March 1 to extent of seller's alloy equivalent of his Feb. 1 inventory of magnesium.

No. 315: Lead Arsenate, effective Feb. 8, 1943. Establishes maximum prices on sales by manufacturers and distributors to other manufacturers or distributors and to all other purchasers, respectively, as follow in cents per pound on a carlot basis: Standard lead arsenate powder, 3-lb. bags or larger 11.00 and 11.50; 1-lb. bags, 16.00 and 20.00; 1-lb. cartons 18.00 and 22.00; ½-lb. cartons, 21.00 and 25.50; Basic lead arsenate powder, 3 lb. bags or larger, 11.50 and 12.00; 1-lb. cartons, 18.50 and 22.50; standard lead arsenate, 5.75 and 6.00. Less than carlot prices are ½-cent higher for lead arsenate and ¼-cent higher for lead arsenate paste.

No. 316: Nonmetallic Minerals, effective Feb. 12, 1943. Establishes maximum prices for coated abrasive products at net price which each seller charged for same commodity on a March, 1942, delivery to a purchaser in the same class. Special consideration granted Tennessee Sandpaper Corp., Nashville, Tenn.

No. 317: War Model Locks, effective Feb. 13, 1943. Establishes specific manufacturers' and jobbers' prices for war model locks and lock sets in which brass, zinc and bronze parts have been replaced by iron and steel. Retail sales remain under the general maximum price regulation. Removes price control of these items from revised price schedule No. 40 which continues to control prices for the brass models.

No. 327: Nonmetallic Minerals, effective Feb. 22, 1943. Establishes maximum prices for the following at the highest price quoted in March, 1942, for the same commodity to a purchaser in the same class: celestite, corundum, cryolite, graphite, low iron content kyanite, agate, andalusite, aplite, asbestos, barite, bentonite, diatomaceous earth, dumortierite, emery, feldspar, flint, fuller's earth, garnet, gilsonite, greensand, Iceland spar, ilmenite, industrial diamonds, kaolin, kieselguhr, nepheline, syenite, olivine, roofing granules, pumice, quartz pebbles, rutile, sepiolite, sillimanite, strontianite, pumicite, topaz, tripoli, vermiculite, and witherite. Maximum prices of certain of these commodities of the following companies are specifically covered: American Abrasive Co., Westfield, Mass.; Kyanite Products Corp., New York; Metals Reserve Co.; Minnesota Mining & Mfg. Co., St. Paul; Pan-Chemical Co., Pomona, Calif.; Western Feldspar Mining Co., Denver; and Yancey Cyanite Co., Asheville, N. C.

No. 342: Nail Keg Staves and Headings, effective March 18, 1943. Establishes maximum prices for nail keg staves and headings. Allows for staves same average margin over costs as existed in 1941 (15 cents per bundle) bringing selling price of 17-inch staves to $1.05 per bundle. Sets prices for staves of other lengths at $1.00 per bundle for 15-inch, $1.08 for 18-inch, $1.13 for 19-inch, and $1.20 for 21-inch lengths. Provides formula for computing prices for staves and headings not specifically listed. Sets following maximum prices for headings; $60.00 per thousand sets for diameters of 9¼ inches, $63.00 for 10¼ inches, $67.00 for 11¼ inches, $72.00 for 12 inches. All prices are f.o.b. mill. Actual transportation costs may be added to ceilings to compute maximum delivered prices.

No. 347: Mica, effective March 26, 1943. Establishes maximum prices for domestic ground mica and mica schist, water-washed mica, and micronized mica. Removes following from price control: scrap mica, crude mica schist. Sellers of ground mica may add ¼-cent a pound to prices at which they made the greatest number of deliveries or offers to deliver of the same grade of mica during March, 1942, to buyers of same class. Sellers of dry ground mica and ground mica schist may add charge for bags no greater than cost of the bags. Freight allowance practice must be same as in effect during March, 1942. Every domestic producer of ground mica and ground mica schist, water-washed mica, micronized mica, fabricated mica produced from sheet mica and build-up mica must file with OPA a copy of current prices for all classes of buyers, indicating maximum price as determined by OPA regulations. Import sales remain subject to General Maximum Price Regulation. Export sales remain subject to Maximum Export Price Regulation.

No. 350: Packers' Tin Cans, effective March 31 in U. S. and May 15, 1943, in Alaska and Hawaii. Establishes specific prices for 90 per cent of volume of packers' cans that are expected to be produced this year and provides a simple formula for pricing remainder.

No. 351: Ferrous Forgings, effective March 31, 1943. Freezes all list prices in effect on Oct. 1, 1941, and provides that ceilings for ferrous forgings sold without list prices between Jan. 1, 1941, and Oct. 1, 1941, shall be prices of the items at their last contract of sale during that period. A new forging closely comparable to a forging which a producer agreed to sell during this period is priced on the basis of the difference in unit costs between the two forgings resulting from the change in specifications. The latter method may be used only if it was the manufacturer's practice on July 22, 1942, to calculate prices on the basis of price previously charged for comparable forgings.

No. 354: Copper Sulphate, effective March 29, 1943. Establishes maximum prices on the basis of $5 per hundredweight, f.o.b. works in bags or barrels, for shipment of 26,000 lbs. or more of 99% crystals.

No. 356: Royalties on Copper, Lead and Zinc Ores, effective April 1, 1943. Freezes royalties paid by domestic mine operators at rates in effect on Dec. 31, 1942. Does not affect royalties based on original premiums of the Premium Price Plan, amounting to 5 cents per pound for copper and 2.75 cents each for lead and zinc, unless these premiums were not included in royalty calculations last year.

War Production Board

New Social Security Building, Washington, D. C.
Telephone Republic 7500

EXECUTIVE OFFICE OF CHAIRMAN

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Special Assts.: Morris Creditor, G. Keith Funston
Assistants: S. J. Weinberg, A. C. C. Hill Jr., E. A. Locke Jr.
Executive Secretary: G. Lyle Belsley
Asst. Executive Secretary: Frederick Roe

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Deputy Directors:
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A. R. Burns, Programs
Harold Stein, Projects
Executive Officer: N. B. Gaddess

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Executive Secretary: Harold Stein
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Industrial Programs: E. R. Gay
Services Programs: Reavis Cox
Supply & Requirements: J. W. Angell
Controlled Materials Div.: C. S. Williams

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Deputy Director: Edward Falck
General Counsel: Herbert S. Marks
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Communications Division: Leighton Peebles, Director
Manufactured Gas Division: Alexander Macomber, Director
Natural Gas Division: (Director to be appointed)
Water Division: Arthur Gorman, Director

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Deputy Director: Col. Bradley Dewey

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Vice Chairman: Col. Robert Johnson

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Solicitor: Milton Katz

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Budget Administration: F. R. Cawley, Director
Personnel Management: Carlton Hayward, Director
Administrative Services: W. A. Murphy, Director
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Vice Chairman on International Supply: William L. Batt
Vice Chairman: Ralph J. Cordiner
Vice Chairman, Operations: D. D. Davis

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Brig. Gen. B. E. Meyers, A.A.F.
Rear Adml. E. M. Pace, Navy

Resources Division
Brig. Gen. F. Hopkins, Chief

CMP and PRP: W. L. Jack Nelson

Aircraft Scheduling Unit
Col. E. M. Powers; Administrator

Program Coordination
Airframes: M. A. Tracy, Chief
Engines, Propellers: A. O. Pierrot, Chief

ALUMINUM-MAGNESIUM DIV. (Bldg. "R")

Director: A. H. Bunker Special Asst.: T. E. Covel
Production Section: P. D. Wilson, Chief
Construction Section: S. M. Anderson, Chief
Distribution Section: G. M. Reed, Chief
Reclamation: Carl H. Burton
Requirements: Gordon Reed
Aluminum, C. B. Batman
Magnesium, P. D. Helser
Warehouse, T. E. Boeger

CONTROLLER OF SHIP PRODUCTION

Controller: William Francis Gibbs

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Associate Director: Charles F. Noyes
Assistant Director: Harold R. Stone

STEEL DIVISION

Director Hiland G. Batcheller

Special Assistants: J. A. Clauss, A. O. Fulton, J. A. Rowan, C. W. King, C. Sterry Long, H. J. Ruttenberg, Robert W. Wolcott

REQUIREMENTS COMMITTEE

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Administrative Section: C. Sterry Long, Chief

Transportation Section: E. G. Plowman, Chief

RAW MATERIALS AND FACILITIES

Assistant Division Director: Carl W. Meyers

Plant Facilities Branch

Chief:

Construction: H. W. Bryant

Planning: A. L. Fairley Jr., Acting Head

Maintenance, Repair: F. A. Weidman

Operations: H. W. McQuaid

Metallurgical, Technical Branch

Chief: H. J. French; Asst.: E. J. Hergenroether

Constructional Steels: R. L. Wilson

Tool Steels & Stainless: S. C. Spalding

Iron, Steel Manufacture: D. J. Reese

Information: E. D. Pratt

Raw Materials Branch

Wm. Kerber, Chief

Iron Ore Section: S. O. Hobart, Chief

Pig Iron Section: J. H. Bemis, Chief

Scrap Section: Alex Miller, Chief

Refractories, Fluxes Section: M. M. Sauers, Chief

Fuel Section: Samuel Weiss, Chief

PRODUCTION

Assistant Division Director: D. F. Austin

Alloy Steel Branch

Chief:

Assts. to Chief: S. A. Crabtree, J. K. Killmer

Constructional Steels: G. L. McBreen

Stainless Steels: P. E. Floyd

Tool Steels: J. P. Larkin

Scheduling: J. F. Reid

Aircraft Alloy Steel: Louis E. Creighton

Wire & Heavy Products Branch

Chief: J. V. Honeycutt

Forgings & Castings: G. F. Hocker

Wire, Rods & Products: H. M. Francis

Plates & Shapes: M. W. Cole

Rails: O. H. Baker

Bar, Sheet & Strip Branch

Chief: G. G. Gries

HR Bars, Semifinished: W. F. Vosmer

Cold Finished Bars: E. B. Files

Sheets & Strip: L. F. Miller

Tubular Products, Tin Plate Branch

Chief: C. H. Longfield

Pipe Section: D. F. Lacy, Chief

Tubing Section: W. H. Wiewel, Chief

Tin Plate Section: R. F. Sentner, Chief

PROGRAM AND DISTRIBUTION

Assistant Division Director: Norman W. Foy

Program Distribution, Control Branch

Chief: John H. Stapleton

Requirements: A. J. O'Leary

Statistics & Control: E. L. Resler; W. A. Hauck

Priorities & Allocations: Charles Halcomb

Tabulating: C. W. Eichelberger

Export Steel Branch: P. F. Schucker, Chief

British Section: J. F. Johnson

Russian Section: R. H. Olson

Latin-American Section: L. S. Simons

General Export Section: T. G. Smith

Steel Recovery Branch

Chief: C. H. Bradley; Asst.: G. R. Link

Classification Section: R. W. Frey

Products Section: E. C. Ryan

Appeals Section: W. L. Moore

Administrative Section: G. G. Broughton

Warehouse Steel Branch: J. R. Stuart, Chief

Merchant Trade Products: E. F. Studwell

General Products: A. Y. Sawyer

Control Section: C. C. Fink

FERROALLOYS (Building "R")

Assistant Division Director: Miles K. Smith

Ferroalloys Branch: Andrew Leith, Chief

W-V-Mo-Co:

Ores, E. F. Hatch

Metals and Alloys, M. T. Metzger

Mn-Chrome Ore: O. N. Rove

Ta-Cb-Ti-Zr: D. F. Frasche

Mn-Cr-Si Metals and Alloys: T. C. Ford

COPPER DIVISION

Director: Harry O. King

Deputy Directors: Michael Schwarz, J. C. Von Daacke

Chief Statistician: Francis R. Kenney

Special Assistants: J. B. Hungate, C. V. Blackburn, J. H. Reed

Legal Counsel: Wm. J. Hoff, Walter Beer

SECTIONS:

Programs: F. R. Kenney, Chief

Distribution: A. R. Mosler, Chief

Resources: G. B. Holderer, Acting Chief

Administrative: V. H. Arnold

BRANCHES:

Primary Production: Frank A. Ayers, Chief
F. H. Hayes, L. F. Hersey, Asst. Chiefs

Secondary Production: J. A. Hines Jr., Chief

Brass Mill: J. W. Douglas, Chief; W. H. Maxwell, Asst. Chief

Wire Mill: E. H. Hammond Jr., Chief; J. W. Mullally, Asst. Chief

Foundry: L. W. Taylor, Chief

Mill Facilities: F. R. Pyne, Chief

Scrap: Guy P. Norton, Chief

Copper Recovery: J. A. Wright, Chief

Conservation:

REQUIREMENTS COMMITTEE

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Asst. Dep. Vice Chairman: J. A. Folger

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Director: Ray C. Ellis

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Material Requirements: C. E. Wampler
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Production Analysis: F. J. Barley

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CONSERVATION DIVISION
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Deputy Director: Harvey A. Anderson
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Simplification: R. B. Shepard, Chief

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Director: Human Director

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Field Operations: W. F. Duckworth
Recovery Operations: Herschel Wilson
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Chief: William McCaw
Price Determination: E. R. Beckner
Washington Requisitioning: J. G. Hager

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Deputy Director: J. Widman Bertch
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General Salvage Branch: W. R. Talbot, Chief
H. L. Gutterson, Exec. Advisor on Field Operations
Scrap Processors Branch: Thomas W. Dunn, Chief
Special Projects Branch: Arden Yinkey Jr., Chief

Resources Protection Board
Chairman: W. K. Frank

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DURABLE GOODS DIV. (Old Jefferson School)
Director: D. P. Felt — Deputy: W. S. Hammersley

TEXTILE, CLOTHING, LEATHER DIV.
Director: Frank L. Walton

SERVICE EQUIPMENT DIV. (RRR Bldg.)
Director: N. G. Burleigh — Deputy: Orval A. Slater

WHOLESALE, RETAIL TRADE DIV. (Bldg. "E")
Director: John A. Hurley

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(Chemicals, Protective Coatings, Synthetic Rubber)
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Projects, Facilities, Machy.: J. A. Lawson, Chief
Industrial Oils: T. L. Daniels, Chief
Plastics, Synthetic Rubber: F. H. Carman, Chief
Protective Coatings: E. H. Bucy, Chief
Alcohol & Solvents: John Boyer, Chief

PRINTING & PUBLISHING DIV. (Building "E")
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Machinery Section: D. B. Fell
Priorities Section: Philip Schneider, R. P. Lund

PULP & PAPER (RR Retirement Bldg.)
Director: Arthur G. Wakeman
Deputy Chiefs: A. G. Wakeman, H. E. Whitaker

CORK AND ASBESTOS DIV. (Bldg. "R")
Director: F. W. Gardner

CONTAINERS DIV. (RR. Retirement Bldg.)
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Assistant Director: Allan L. Brack
Metal Cans, Tubes: R. S. Solinsky
Steel Drums: Smith Johnson

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Director: James Auten

LUMBER DIVISION (433 Third St.)
Director: J. P. Boyd

PLUMBING & HEATING (RR Retirement Bldg.)
Director: Joseph F. Wilber — Deputy: Ronald Allwork
Heating Section: D. H. Butler
Priorities Section: Bradley Randall
Pipes, Valves, Fittings: M. C. Menaker
Appliances: Lynn Eaton

TRANSPORTATION EQUIPMENT DIV. (515 22nd)
Director: Andrew Stevenson — Deputy: G. M. Cornell

BUILDING MATERIALS DIV. (470 Indiana Ave.)
Director: John L. Haynes
Assistants: C. P. Redick, H. W. Parsons
Miscel. Metals: Stewart Wirgman
Electric Wiring: W. J. Flynn
Bolts, Nuts, Screw Machine Products: P. T. Williams
Hardware, Small Tools: Roy Halquist

EQUIPMENT BUREAU

Director: Harry A. Rapelye

FARM MACHINERY, EQUIPMENT DIV. (Bldg. "E")
Director: George Krieger
Asst. Director: W. Burr Downs

CONSTRUCTION MACHINERY DIVISION
Director: M. B. Gardner

TOOL DIVISION
Director: G. H. Johnson — Deputy: John Chafee
Administrative Officer: G. H. McEwen
Information Specialist: Charles Wood
Production Branch
Chief: B. H. Bickle
Machine Tool Facilities: H. H. Strouse
Survey & Scheduling: E. B. Andrews
Machine Tool Production: R. R. Ryan
Gages: Sam Wood
Requirements & Distribution Branch
Chief: A. M. Stedfast
Technical Section: A. M. Johnson
Material Requirements: J. O. Matthews
Substitution & Diversion: F. A. Brechter
Used Tools: E. F. Seifreat
Forges & Presses: Robert Lacy
Industrial Specialties Branch
Chief: F. T. Stone
Cutting Tools: S. D. Conant
Abrasives: W. T. McCargo
Industrial Supplies: L. E. Beaupre
Foundry Equipment: Thomas Kaveny Jr.
Heat-treating Equipment: Bradley Stoughton
Cranes & Hoists: J. D. Glatz
Anti-friction Bearings: H. C. Sauer
Electrical: John C. Borden

GEN. INDUSTRIAL EQUIPMENT DIV.
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Air Conditioning, Refrig.: Sterling Smith

SAFETY & TECH. SUPPLIES DIV.
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AUTOMOTIVE DIVISION
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Replacement Parts: J. J. Donovan
War Agency Section: C. S. Doerr
Rating Section: R. L. Burton
Truck Section: T. A. Baggs
Materials Section: L. T. Bonner
Expediting Section: David Harr

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TIN-LEAD DIVISION (Building "R")
(Lead, Tin, Bismuth, Ilmenite pigment, Antifriction Bearing Metals, Solders)
Director: Erwin Vogelsang. — Deputy: S. K. Butterworth
Priority Specialist: J. A. Mirel
Mining Section: C. A. Wright, Chief; H. B. Leggett
Conservation and Distribution: Roy F. Segur, Chief; A. L. Woas, Frank Benson
Tin-Lead Scrap: I. Davis, W. L. Raup Jr.
Detinning: C. Mac Veagh
Civilian Allocation: David Schwartz
ZINC DIVISION (Building "R")
Deputy Director: Platt C. Benedict
Distribution Section: Myron L. Trilsch, Chief; A. H. Meuche, G. L. McRory, W. A. Huey, W. W. Hopton
PRP Section: G. L. McRory
Production Section: W. C. Page, Chief
Conservation Section: F. M. Carlson, Acting Chief; Archibald Little, H. L. Minister
Cadmium Section: H. J. Wolf, Chief
MICA-GRAPHITE DIVISION (Building "R")
(Mica, Graphite, Gypsum, Magnesite, Cryolite, Fluorspar, Cadmium, Bismuth, Indium, Gallium)
Deputy Director: M. H. Billings
Mica Section: S. A. Montague
Graphite Section: F. L. Wolf
Electrodes: M. H. Billings
Fluorspar-Magnesite: H. T. Mudd
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Director: Arthur S. Knoizen
Deputy Directors: Dr. M. H. Stow; F. S. Miller
Coal Section: D. L. McElroy, Chief
Metals Section: James Douglas, Chief
Non-metallics Section: E. W. Bauman, Chief
Mining Machy. Section: L. W. Hildreth, Chief
Smelters Section: H. E. Egolf Jr., Chief
Program Section: A. F. Brosky, Chief
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Director: Richard J. Lund

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Executive Asst.: Brig. Gen. J. L. Philips

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Chairman: J. A. Krug

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Controller Division
Director: David Novick; Asst.: Frank Crozier
Analysis & Reports: G. A. Steiner
Central Recording: Clarkson Stevens
Accounting Systems: H. O. Corder
Canadian Review Division
Director: Joseph M. Tucker
Compliance Division
Director: William John Logan
Chief Compliance Commissioner: W. H. Foster
Field-Co-ordination: J. H. Kilby
Enforcement: H. J. Dowd

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Deputy Director: Bertrand Fox
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Non-Military Div.: M. G. De Chazeau, Director
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Petroleum Div.: Greer W. Orton, Director
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Director: Lee Marshall

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Controlled Materials Plan Division
Director: Walter C. Skuce
Scheduling Methods: C. R. Fay
Engineering Board of Review: G. M. Bralla
Instruction, Inquiry, Service: T. W. Moss
Co-ordination: H. P. Nelson
Scheduling Division
Director: Harry Zellman

ORDERS, REGULATIONS BUREAU

Director: (To be appointed)
Appeals Board: A. N. Holcombe, Chairman
Orders and Regulations Branch
Chief: (To Be Appointed)

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Vice Chairman: W. L. Batt

LABOR PRODUCTION DIVISION

Director: Wendell Lund

WAR PRODUCTION DRIVE HEADQUARTERS

Director: W. G. Marshall

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U. S. Secretary: Stanley Phraner
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Deputy Members: W. L. Batt, U. S.; Sir Robert Sinclair, U. K.; E. P. Taylor, Canada.
Executive officers: Milton Katz, U. S.; Thomas Brand, U. K.; Sidney Pierce, Canada.

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Vice Chairman: Ralph J. Cordiner

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Deputy Director: Col. G. E. Textor
PROGRAM DIVISION
Director: Esty Foster
CONSTRUCTION DIVISION
Director: F. J. C. Dresser
Asst. Director: T. L. Peyton
Materials Control: Harlow Lewis
Housing: Sullivan Jones
Projects Service: Hugh Beshers
Project Analysis: John McTigue
Consultation: D. L. Hoopingarner
} Empire State Bldg., N. Y.

FACILITIES DIVISION

W. B. Murphy, Director

PLANNING COMMITTEE

Chairman: R. R. Nathan
Executive Director: Edward T. Dickinson Jr.

PROCUREMENT POLICY DIVISION

Acting Director: Tudor Bowen
Executive Officer: C. Irving Hansen
Contract Review Branch: C. G. Blough
Information: John T. Moutoux
Accounting Advisory Branch
Chief: M. C. McIntosh; Consultant: Eric Camman

OFFICE OF PRODUCTION RESEARCH, AND DEVELOPMENT

Director: Harvey N. Davis
Assistant Directors: Harold H. Thurby, Richard A. Wolff

OFFICE OF PROGRESS REPORTS

Director: Stacy May
Associate Director: M. Joseph Meehan

RESOURCES PROTECTION BOARD

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Vice Chairman: W. M. Flower

STATISTICS DIVISION

Director: Stacy May
Associate Director: Dr. Simon Kuznets

REGIONAL OFFICES

ATLANTA, with jurisdiction over Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida. Regional Director, Frank H. Neely, Candler building.

BOSTON, with jurisdiction over Massachusetts, Connecticut, Rhode Island, Vermont, New Hampshire, Maine. Regional Director, Walter H. Wheeler Jr., 17 Court street.

CHICAGO, with jurisdiction over Illinois, Indiana, Iowa, southern Wisconsin. Regional Director, A. T. Kearney, 226 W. Jackson Boulevard. Telephone: Andover 3600.

CLEVELAND, with jurisdiction over Ohio (except Toledo area) Kentucky, West Virginia, western tip of Maryland, western Pennsylvania (including Pittsburgh, Johnstown and Erie). Regional Director, John C. Virden, Union Commerce building. Telephone: Cherry 7900.

DALLAS, with jurisdiction over Texas, Louisiana, Oklahoma. Regional Director R. E. Risser, Fidelity building.

DETROIT, with jurisdiction over Lower Peninsula of Michigan and Toledo area in Ohio. Regional Director, D. J. Hutchins, 7310 Woodward avenue. Telephone: Trinity

DENVER, with jurisdiction over Colorado, New Mexico, Utah, Wyoming. Regional Director, Leslie A. Miller, Kittredge

KANSAS CITY, with jurisdiction over Missouri, Arkansas, Kansas, Nebraska. Regional Director, W. Capen Shank, Mutual Interstate building. Telephone: Victor 7780.

MINNEAPOLIS, with jurisdiction over Minnesota, North Dakota, South Dakota, northern Wisconsin, Upper Peninsula of Michigan. Regional Director, F. Peavey Heffelfinger, Midland building. Telephone: Main 3244.

NEW YORK, with jurisdiction over New York and portion of New Jersey north of Trenton. Regional Director, John P. Maguire, 122 E. 42nd street, Telephone: Murray Hill 3-6805.

PHILADELPHIA, with jurisdiction over Pennsylvania (except portion in Cleveland region), Delaware, Virginia, New Jersey (south of and including Trenton), Maryland (except western tip). Regional Director, Orville H. Bullitt, 1617 Pennsylvania Boulevard. Telephone: Locust 3400.

SAN FRANCISCO, with jurisdiction over California, Arizona, Nevada. Regional Director, Harvey H. Fair, 1355 Market street. Deputy Regional Director, L. Edward Scriven. Tele-

SEATTLE, with jurisdiction over Washington, Oregon, Idaho, Montana. Regional Director, Milton H. Luce, White-Henry-Stuart building.

BRANCH OFFICES

Alabama
Birmingham, Phoenix Bldg.
Mobile, First Nat'l. Bank Bldg.

Arizona
Phoenix, Security Bldg.
Tucson, 62 E. Congress St.

Arkansas
Fort Smith, Kelley Bldg.
Little Rock, Pyramid Bldg.

California
Fresno, Mattei Bldg.
Los Angeles, 1031 South Broadway
Oakland, 1924 Broadway
Sacramento, Farmer's & Mechanics Bldg.
San Diego, Trust & Savings Bldg.
San Francisco, 1355 Market St.

Colorado
Denver, Kittredge Bldg.
Pueblo, Post Office Bldg.

Connecticut
Hartford, 119 Ann St.
Bridgeport, 144 Golden Hill St.
New Haven, 152 Temple St.

Delaware
Wilmington, Pennsylvania Bldg.

Florida
Jacksonville, 530 Lynch Bldg.
Miami, Congress Bldg.
Tampa, Wallace South Bldg.

Georgia
Atlanta, Candler Bldg.

Idaho
Boise, Capital Securities Bldg.

Illinois
Chicago, 226 W. Jackson Blvd.
Decatur, Standard Office Bldg.
Peoria, Alliance Bldg.
Rockford, Gas & Electric Bldg.
Springfield, Leland Office Bldg.

Indiana
Evansville, 8 Koenig Bldg.
Ft. Wayne, Utility Bldg.
Gary, Gary State Bank Bldg.
Indianapolis, Circle Tower Bldg.
South Bend, 206 City Nat'l Bank Bldg.

Iowa
Davenport, Kahl Bldg.
Des Moines, Liberty Bldg.

Kansas
Wichita, Union National Bank Bldg.

Kentucky
Louisville, Todd Bldg.

Louisiana
New Orleans, Canal Bldg.
Shreveport, Ardis Bldg.

Maine
Portland, 142 High St.

Maryland
Baltimore, 1254 Baltimore Trust Bldg.

Massachusetts
Boston, 17 Court St.
Lowell, 8 Merrimac St.
Springfield, 1200 Main St.
Worcester, 340 Main St.

Michigan
Detroit, 7310 Woodward Ave.
Grand Rapids, Mich. Nat'l Bank Bldg.
Iron Mountain, Commercial Nat'l Bank Bldg.

Minnesota
Minneapolis, Midland Bank Bldg.
Duluth, Christie Bldg.

Mississippi
Jackson, 605 Tower Bldg.

Missouri
St. Louis, Paul Brown Bldg.
Kansas City, Mutual Interstate Bldg.
Joplin, Joplin Nat'l Bank Bldg.

Montana
Helena, Power Block Annex

Nebraska
Omaha, City Nat'l Bank Bldg.

Nevada
Reno, Saviers Bldg.

New Hampshire
Manchester, Amoskeag Industries Bldg.

New Jersey
Camden, 300 Broadway
Newark, Globe Indemnity Bldg.
Trenton, Broad Street Bank Bldg.

New Mexico
Albuquerque, 103½ West Central Ave.

New York
New York, Chanin Bldg., 122 E. 42nd St.
Albany, 112 State St.
Buffalo, 1138 Rand Bldg.
Rochester, 707 Commerce Bldg.
Syracuse, 224 Harrison St.
Utica, First Nat'l Bank Bldg.

North Carolina
Charlotte, Charlotte Law Bldg.
Raleigh, Sir Walter Hotel Bldg.

North Dakota
Bismarck, First National Bank Bldg.
Fargo, 400 Universal Bldg.

Ohio
Akron, 618 Central Tower
Canton, First Nat'l Bank Bldg.
Cleveland, Union Commerce Bldg.
Cincinnati, 34 East Fourth St.
Columbus, 513 East Town St.
Dayton, 129 South Ludlow St.
Lima, Colonial Finance Bldg.
Toledo, Security Bank Bldg.
Youngstown, Union National Bank Bldg.

Oregon
Portland, Bedell Bldg.

Oklahoma
Oklahoma City, Key Bldg.
Tulsa, Petroleum Bldg.

Pennsylvania
Philadlephia, Broad St. Station Bldg.
Allentown, 506 Hamilton St.
Chester, 12-14 East Fifth St.
Erie, Erie Trust Company Bldg.
Harrisburg, 112 Market St.
Johnstown, U. S. National Bank Bldg.
Lancaster, Woolworth Bldg.
Norristown, Norristown-Penn Trust Bldg.
Pittsburgh, 1st National Bank Bldg.
Reading, 615 Penn St., Scranton, First National Bank Bldg.
Wilkes-Barre, Sterling Hotel Bldg.
Williamsport, 120 West Fourth St.
York, Yorktowne Hotel

Rhode Island
Providence, Industrial Trust Bldg.

South Carolina
Columbia, Manson Bldg.
Greenville, Palmetto Bldg.

South Dakota
Sioux Falls, Western Surety Bldg.

Tennessee
Chattanooga, James Bldg.
Knoxville, Goode Bldg.
Memphis, Sterick Bldg.
Nashville, Stahlman Bldg.

Texas
Dallas, Fidelity Bldg.
El Paso, Caples Bldg.
San Antonio, Majestic Bldg.

Utah
Salt Lake City, Atlas Bldg.

Vermont
Montpelier, 84 State St.

Virginia
Norfolk, 526 Dickson Bldg.
Richmond, Schmidt Bldg.
Roanoke, 29 Franklin Road, West

Washington
Seattle, White-Henry-Stuart Bldg.
Spokane, Sun Life Assurance Bldg.

West Virginia
Charleston, Capital City Bldg.
Clarksburg, Union Natl. Bank Bldg.
Huntington, West Virginia Bldg.
Wheeling, Fidelity Bldg.

Wisconsin
Appleton, 341 West College Ave.
Eau Claire, 128½ Graham Ave.
Madison, Washington Bldg.
Milwaukee, Plankinton Bldg.
Wausau, 408 Third St.

Wyoming
Casper, P. & R. Bldg.

Office of Price Administration

Federal Office Building, Second and "D" Washington, D. C.
Telephone Republic 7500

Administrator: Prentiss M. Brown
General Counsel: George J. Burke
Secretary: Charles A. Bishop
Deputy Administrators:
Dr. J. K. Galbraith
Dexter M. Keezer
Paul M. O'Leary
Paul A. Porter

PRICE DIVISIONS

Deputy in Charge: Dr. J. K. Galbraith
Special Assistant: W. A. Neiswanger
Field Relations: B. E. Oppenheim
Export-Import Control: S. E. Harris

FOOD DIVISION
Director: A. C. Hoffman
Divisional Economist: T. P. Cavin
Fertilizer, Insecticide Branch
Executive: George Cushman
Food, Food Products Branch
Executive: A. C. Hoffman

TEXTILE, LEATHER, APPAREL
Acting Director: B. F. Haley

FUEL DIVISION
Director: Sumner T. Pike
Crude Oil Production: W. B. Joyes
Petroleum Branch
Executive: G. W. Doffing
Solid Fuels Branch
Executive: G. B. Gould
Bituminous Mines: J. H. Reppert
Economic Research: W. H. Voskuil
Anthracite Mines: R. R. Rawls
Dealer Prices: Stuart Bavier

INDUSTRIAL MFG. DIVISION
Director: Donald H. Wallace
Chemicals and Drug Branch
Executive: Patrick M. Malin
Machinery Branch
Executive: Thomas J. Kinsella
Construction Equip.: Walter Shoemaker
Electrical Equipment: M. W. Lee
Farm Equipment: D. V. Booz (acting)
General Machinery: D. V. Booz
Machine Tools: J. J. Rodgers
Machine Parts: H. W. Huegy
Processing Machy.: H. W. Reilly
Transportation Equip.: C. F. Munroe
Paper and Products Branch
Executive: J. A. Perkins
Rubber Branch
Executive: R. F. Bryan
Assistant: R. F. Campbell
Mechanical Goods: P. G. Hudson

SERVICES, DURABLE GOODS DIVISION
Director: Merle Fainsod
Consumer Durable Goods Branch
Executive: Alfred Auerbach
Associate Executives: H. C. Mansfield, George S. Ujlaki, William Ehrlich
Economic Research: Laurence S. Knappen

INDUSTRIAL MATERIALS DIVISION
Director: Clair Wilcox
Building Materials Branch
Executive: Neil Staebler
Nonferrous Metals Branch
Executive: John D. Summer
Associates: E. S. Glines, Karl Anderson
Administrative Officer: N. H. McDiarmid
Basic Metals & Mining Section
Head: O. C. Lockhart
Principal: F. M. Boddy
Copper, Lead & Zinc: F. C. Holder
Aluminum & Magnesium: A. A. Throckmorton
Silver, Gold & Platinum: J. O. Coff
Tin, Antimony & Cadmium: C. W. Tow
Ferroalloys Section
Head: G. J. Degner
Ferrosilicon, Manganese: W. F. McKinnon
Tungsten and Molybdenum: P. A. Reinertson
Chromium and Vanadium: R. D. Stickney
Tool Steel Scrap & Cobalt: W. F. Sterling
Minerals, Minor Metals Section
Head: Philip Woolfson
Minerals & Products: Philip Woolfson
Minor Metals & Products: Charles Walsh
Scrap, Secondary Metals Section
Zinc, Lead, Tin: K. J. Rahlson
Copper, Brass, Bronze, Nickel & Ingot: W. G. Jones
Fabricated, Manufactured Prod. Section
Manufactured Products: David Laine
Mill Products: Fred Jussen
Machine Products: David Laine
Foundry Products: Joseph Meier
Iron and Steel Branch
Executive: D. D. Kennedy
Associate: W. M. Huff
Administrative Section: W. T. Wolfrey Jr.
Basic Materials: D. A. Tutein
Castings Section: R. R. Horner
Fabricated Products: Weldon Welfling
Reusable Products: Samuel Ewing
Research: Paul Van Arsdell
Scrap: C. D. Scully Jr.
Mill Products: G. Griffith Johnson
Warehouses—Jobbers: E. L. Wyman
Lumber Branch
Executive: P. A. Stone

RATIONING DIVISIONS

Deputy in Charge: P. M. O'Leary
Executive Officer: L. J. Kroeger

AUTOMOTIVE DIVISION
Director: C. F. Phillips
Automobile Branch
Executive: H. G. Larson
Bicycle Branch
Chief: C. P. McFadden
Gasoline Branch
Executive: J. R. Richards
Tire Branch
Executive: E. C. Leach

FOOD DIVISION
Director: H. B. Rowe

FUEL DIVISION
Executive: Joel Dean
Operations Section: W. S. Sayre
Fuel Oil: Laurence C. Vass
Industry Relations: G. G. Traver

MISCELLANEOUS PRODUCTS DIVISION
Acting Director: P. H. French

GENERAL SERVICES

Deputy Administrator: D. M. Keezer
Accounting: H. S. Taggart
Administration: G. C. S. Benson
Information:
Robert Strauss
L. S. Plummer
Ralph Hotchkiss (Prices)
Luther Reid (Rationing)
Gene Pharo (Metals)
Taft Feiman (Machinery)

TRANSPORTATION, PUBLIC UTILITIES
Director: R. A. Nixon

RESEARCH DIVISION
Director: R. V. Gilbert

STANDARDS DIVISION
Chief: W. S. MacLeod

RENT DEPARTMENT
Operations Division: Ivan D. Carson
Deputy Administrator: P. A. Porter
Executive Officer: William Brownrigg

REGIONAL AND DISTRICT OFFICES

REGION I

Regional Office

Boston, 17 Court street
Regional Admin.: K. B. Backman
Executive Officer: Carl Rogers
Price Executive: Frank Beane

District Offices

Connecticut
Hartford, 55 Allyn St.
Chester Bowles, Dist. Mgr.

Maine
Augusta, 151 Water St.
Prescott H. Vose, Dist. Mgr.

Massachusetts
Boston, 10 Post Office Square
L. J. Bresnahan, Dist. Mgr.
Springfield, 1597 Main St.
F. L. H. Sjostrom, Acting Dist. Mgr.
Worcester, 9 Walnut St.
Warren A. Whitney

New Hampshire
Concord, 15 Capitol St.
Russell R. Larmon, Dist. Mgr.

Rhode Island
Providence, Hospital Trust Bldg.
Christopher Del Sesto, Dist. Mgr.

Vermont
Montpelier, Pavilion Hotel.
James J. Carney, Acting Dist. Mgr.

REGION II

Regional Office

New York, 350 Fifth avenue
Regional Admin.: Sylvan L. Joseph
Executive Officer: J. R. Johnston
Price Executive: William Shine

District Offices

Delaware
Wilmington, 102 Pennsylvania Railroad Bldg.
James L. Luke, Dist. Mgr.

District of Columbia
Washington, 5601 Conn. Ave.
R. K. Thompson, Acting Dist. Mgr.

Maryland
Baltimore, Baltimore Trust Bldg.
Leo S. McCormick, Dist. Mgr.

New Jersey
Newark, 20 Washington Place.
James Kerney Jr., Dist. Mgr.
Camden, 300 Broadway
Harry F. Roye, Dist. Mgr.
Trenton, 145 E. State St.
Ralph W. Hackett, Dist. Mgr.

New York

New York, Empire State Bldg.
Russell H. Potter, Dist. Mgr.
Albany, 112 State St.
Albert E. Oliver, Dist. Mgr.
Binghamton, Telephone Co. Bldg.
Cornelius C. Van Patten, Dist. Mgr.
Buffalo, 190 Delaware Ave.
W. S. Grattan, Dist Mgr.
Rochester, 1203 Temple Bldg.
Joseph Paterson, Dist. Mgr.
Syracuse, Syracuse-Kemper Bldg.
Steven Toadvine, Dist. Mgr.

Pennsylvania

Philadelphia, N. Broad St. Station. Bldg.
R. F. Ashenfelter, Dist. Mgr.
Altoona, 12th Ave. and 12th St.
Paul T. Winter, Dist. Mgr.
Erie, Commerce Bldg.
Charles Leslie, Dist. Mgr.
Harrisburg, Blackstone Bldg.
Guy Swope, Dist. Mgr.
Pittsburgh, 205 Fulton Bldg.
Alvin J. Williams, Dist Mgr.
Scranton, Lincoln Trust Bldg.
Thomas F. Leahy, Dist. Mgr.
Williamsport, Natl. Bank Bldg.
Raymond S. Thrall, Dist. Mgr.

OFFICE of PRICE ADMINISTRATION

REGION III

Regional Office

Cleveland, Union Commerce building
Regional Admin.: B. L. Williams
Executive Officer: Russell Cook
Price Executive: C. L. James

District Offices

Indiana
Indianapolis, 501 N. New Jersey St.
James D. Strickland, Dist. Mgr.
South Bend, 224 W. Jefferson Blvd.
Frank H. Sibley, Dist. Mgr.

Kentucky
Lexington, 152 E. Short St.
E. Reed Wilson, Dist. Mgr.
Louisville, 700 Kenyon Bldg.
George H. Goodman, Dist. Mgr.

Michigan
Detroit, 600 Griswold Ave.
Arthur H. Sarvis, Dist. Mgr.
Grand Rapids, Keeler Furniture Bldg.
Jacob Zweedyk, Dist. Mgr.
Iron Mountain, 101½ E. Ludington St.
Edward J. Dundon, Dist. Mgr.
Saginaw, 135 North Water St.
John F. Kessel, Dist. Mgr.

Ohio
Columbus, 68 East Gay St.
H. T. Beckman, Dist. Mgr.
Cincinnati, 605 Union Trust Bldg.
George E. McClellan, Dist. Mgr.
Cleveland, Union Commerce Bldg.
Clinton M. Fiske, Acting Dist. Mgr.
Dayton, 23 North Sears St.
Arthur C. Stock, Dist. Mgr.
Toledo, Home Bank Bldg.
Ort D. Wearley, Dist. Mgr.

West Virginia
Charleston, 217 Peoples Bldg.
Carl M. Frasure, Dist. Mgr.
Wheeling, Fidelity Bldg.
William N. Hogan, Dist. Mgr.

REGION IV

Regional Office

Atlanta, Candler Building
Regional Adm.: James C. Derieux
Executive Officer: J. A. Short
Price Executive: R. P. Brooks

District Offices

Alabama
Birmingham, Phoenix Bldg.
Joseph A. Short, Dist. Mgr.
Montgomery, Bell Bldg.
Albert H. Collins, Dist. Mgr.

Florida
Jacksonville, Barnett Nat'l B'k Bldg.
Chauncey Butler, Dist. Mgr.
Tampa, 608 Tampa St.
Carlton C. Cone, Dist. Mgr.

Georgia
Atlanta, 44 Pryor St. N.W.
Allison Thornwell, Dist. Mgr.
Savannah, 35 Bull St.
John W. Corswell, Dist. Mgr.

Mississippi
Jackson, Tower Bldg.
W. E. Holcomb, Dist. Mgr.

North Carolina
Raleigh, 227 E. Edenton St.
Theodore S. Johnson, Dist. Mgr.
Charlotte, 730 E. Trade St.
L. W. Driscoll, Dist. Mgr.

South Carolina
Columbia, Liberty Life Bldg.

Tennessee
Knoxville, Daylight Bldg.
Memphis, 221 Sterrick Bldg.
W. C. Manley Jr., Dist. Mgr.
Nashville, Stahlman Bldg.
John T. Gray, Dist. Mgr.

Virginia
Norfolk, Portlock Bldg.
L. E. Borkhouser, Dist. Mgr.
Richmond, Schmidt Bldg.
J. Fulmer Bright, Dist. Mgr.
Roanoke, 29 W. Franklin Rd.
Bernard C. Goodwin, Dist. Mgr.

REGION V

Regional Office

Dallas, Fidelity Union building
Regional Admin.: M. McCullough
Executive Officer: W. H. Brooks
Price Executive: C. W. Nichols

District Offices

Arkansas
Little Rock, Commercial Nat'l B'k Bldg.
Robert P. Hall, Dist. Mgr.

Kansas
Wichita, York-Rite Bldg.
Henry O. Davis, Dist. Mgr.

Louisiana
Baton Rouge, 304 Triad Bldg.
Uhle S. Goodman, Dist. Mgr.
New Orleans, Canal Bldg.
L. E. Frazer, Dist. Mgr.
Shreveport
Joseph E. Brumfield, Dist. Mgr.

Missouri
St. Louis, 640 Paul Brown Bldg.
Russell E. Gardner Jr., Dist. Mgr.
Kansas, Mutual Interstate Bldg.
James G. Callaway, Dist Mgr.

Oklahoma
Oklahoma City, Key Bldg.
Rex Hayes, Dist. Mgr.
Tulsa, Mayo Bldg.
Ben O. Kirkpatrick, Dist. Mgr.

Texas
Dallas, 1100 Main St.
William A. Orth, Acting Dist. Mgr.
Fort Worth, Club Bldg.
Mark McGee, Dist. Mgr.
Houston, 820 Electric Bldg.
Ben Taub, Dist. Mgr.
Lubbock, Natl. Bank Bldg.
Howard R. Gholson, Dist. Mgr.
San Antonio, Majestic Bldg.
Frank Covert, Dist. Mgr.

REGION VI

Regional Office

Chicago, 226 W. Jackson Blvd.
Regional Admin.: R. S. McKeough
Executive Officer: T. K. Tindale

District Offices

Illinois
Chicago, 228 N. La Salle St.
Michael F. Mulcahy, Director
Moline, 1630 Fifth Ave.
Oscar Brandt, Acting Dist. Mgr.
Peoria, 410 S. Main St.
Earl Clark, Dist. Mgr.
Rockford, 127 N. Wyman St.
A. B. Culhane, Acting Dist. Mgr.
Springfield, 301 W. Adams St.
Carter Jenkins, Dist Mgr.

Iowa
Des Moines, Liberty Bldg.
Robert B. Adams, Dist. Mgr.
Sioux City, Frances Bldg.
Henry J. Gleason, Dist. Mgr.

Minnesota
St. Paul, First Nat'l B'k Bldg.
Theodore S. Driscoll, Dist. Mgr.
Duluth, 120 N. Fourth St.
Patrick Burke, Dist Mgr.

Nebraska
Lincoln, 625 Stuart Bldg.
D. F. Felton, Dist. Mgr.
North Platte, 111 East 6th St.
Charles Smrka, Dist. Mgr.
Omaha, 317 City Natl. Bank Bldg.

North Dakota
Bismarck, Harvester Bldg.
Fred Krause Jr. Dist. Mgr.
Fargo, 510 Fourth Ave., N.
Harold Bangert, Dist. Mgr.

South Dakota
Pierre, 115 E. Dakota Ave.
Guy Harding, Dist. Mgr.
Sioux Falls, 405½ Eighth St.
John J. Verschoor, Dist. Mgr.

Wisconsin
Green Bay, 414 E. Walnut St.
Lawson Bauer, Dist. Mgr.
La Crosse, Fifth Ave. and Jay St.
Fred Warner, Acting Dist. Mgr.
Milwaukee, Plankinton Bldg.
Don T. Allen, Dist. Mgr.

REGION VII

Regional Office

Denver, Kittredge building
Regional Admin.: Clem W. Collins
Executive Officer: A. H. Rosenthal
Price Executive: A. D. H. Kaplan

District Offices

Colorado
Denver, Kittredge Bldg.
H. C. Bretschneider, Dist. Mgr.

Idaho
Boise, Capital Securities Bldg.
C. C. Anderson, Dist. Mgr.

Montana
Helena, Placer Hotel.
A. T. Peterson Dist. Mgr.

New Mexico
Albuquerque, 320 W. Central Ave.
S. M. Graf, Dist. Mgr.

Utah
Salt Lake City, Atlas Bldg.
H. Grant Ivins, Dist. Mgr.

Wyoming
Cheyenne, State OPA Bldg.
Henry Watenpaugh, Dist. Mgr.

REGION VIII

Regional Office

San Francisco, 1355 Market street
Regional Admin.; Frank E. Marsh
Price Executive: Norman Buchanan

District Offices

Arizona
Phoenix, 17 W. Van Buren Rd.
Hilliard T. Brooke, Dist. Mgr.

California
Fresno, 430 Patterson Bldg.
Kenneth Hampton, Dist. Mgr.
Los Angeles, 1031 South Broadway
S. Leask, Director for Southern California
Sacramento, Fourth & J. Streets
T. W. Sullivan, Acting Dist. Mgr.
San Diego, 530 Broadway
Addison E. Housh, Dist. Mgr.
San Francisco 1355 Market St.
F. E. Carroll, Director for Northern California

Nevada
Reno, 285 South Virginia St.
Leo Schmitt, Dist. Mgr.

Oregon
Klamath Falls, Main & Esplanada Sts.
Portland, 520 S. West Sixth Ave.
R. C. Montgomery, Dist. Mgr.

Washington
Seattle, 1338 Fourth Ave.
Henry B. Owen, Dist. Mgr.
Spokane, 1023 Riverside St.

REGION IX

Washington, Room 238, Temporary "D"
Regional Admin.: Rupert Emerson

Territories

Alaska, Juneau
Mrs. M. R. Hermann, Director

Hawaii, Honolulu
Karl Borders, Director

Puerto Rico, San Juan
William B. Mead Director

Virgin Islands, St. Thomas
Jacob A. Robles, Director